CENTRAL INTELLIGENCE AGENCY

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report concerning some of the scientific projects of the Scientific-Technical Bureau for Engine Research (VEB Wissenschaftlich-Technisches Buero fuer Kraftmaschinenbau IV), Berlin-Adlershof.

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Subject: Some Projects of the Scientific-Technical Bureau for Engine Research BERLIN-ADLERSHOF

1. Designation

VEB WISSENSCHAFTLICH-TECHNISCHES BUERO FUER KRAFTMASCHINENBAU IV

2. Location

25X1

Berlin-Adlershof, Rudower Chaussee 26-30.

[redacted]

3. Labour Force

Approx 550 persons are employed with the works. Approx 150 are administrative and commercial staff, the remainder are scientific and technical staff. Daily office hours are 0700 to 1600 Mon - Thur, 0700 to 1530 Fri, 0700 to 1130 Sat.

4. Management

Dr. Gerhard KROEBER	Director of Works
Joseph BASTIN	Technical Director of Works
SOSSNA, frm	Chief Bookkeeper

Dept. '250', Laboratory

Walter SCHILLING	Dept Head
Dipl-Ing. Horst FOERSTER	Assistant Dept. Head and Group Leader

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Dipl-Ing. Wolfgang RHODE	Group Leader
Dipl-Ing. Arno HOEHNE	Group Leader

Dept. '240', Production

Heinz ANDRESEN	Head of Dept
VORWERK, fnu	Assistant Dept. Head i/c production planning
Xaverl SCHLEICHER	Assistant Dept. Head, master mechanic
Herbert DIETRICH	i/c machine tools
Heinz SIEBERT	i/c plumber's shop
KAWEZCINSKI, fnu	i/c quality control
HOLZHAUER, fnu	Quality control
KUJAS, fnu	i/c repeated projects

Dept. '250', Research and Development

Dipl-Ing. FRANKE, fnu	Dept. Head
Wolfgang MEYER	i/c research projects
Otto MUELLER	i/c research projects
FLECK, fnu	i/c research projects
QUEISSER, fnu	i/c test stands
STEINMANN, fnu	Assistant i/c
PFANNSCHMIDT, fnu	Master mechanic test stands
MEIER, fnu	Master mechanic test stands

Design and Draughting Dept.

ABERMETH, fnu, Dipl-Ing	Dept. Head i/c research projects
BURKHARDT, fnu, Dipl-Ing.	Assistant Dept. Head
von LOEWIS of MENAR, fnu Dipl-Ing.	Assistant Dept. Head
Dipl-Ing. HAENEL, fnu	Consultant Engineer, Diesel specialist

Design and Draughting Dept, Equipment and Engines

Alfred MEIER	Dept. Head
FISCHER, fnu	Group Leader
MIKA, fnu	Group Leader

Military Research

BELZ, fnu	Dept. Head

5. Subordination

Since 1957 the WTB has been subordinate to the 'AMT FUER TECHNIK'. One, WEBER fnu, of the 'AfT' is responsible for the WTB. He is in close contact with the works. Hearsay is to the effect the subordination to the 'AfT' will cease in the near future. No further knowledge.

6. Projects

(a) 1948 - 1954

(1) Vibration Equipment for Vehicles, Project Designation: '3 m'

The order was given in 1952, by the Moscow 'AKADEMIE DER WISSENSCHAFTEN', directly to the WTB. The equipment was delivered in 1954 to the USSR. The equipment consists of 5 separate units:

Compressor and compressed air container
2 Vibration units
Control desk
Measuring and Registering Board.

Vibration Units

Each is of a different type. One works on the piston system the other on the roller system. The piston unit has 4 air-pressure cylinders in which the pistons are located. The piston rod is pointing upwards and, at its end, is fitted with a clamping device for the vehicles wheels. The distance of the pistons may be altered to suit the different widths and lengths of the various vehicles. The piston movement is controlled by a drum with variable contacts. There are a number of contacts for each piston in order that they may move independently of each other. The contacts control frequency and amplitude of the piston movement.

The roller system unit has two pairs of rollers, one for the front the other for the rear wheels. All rollers are fitted with cams to provide for the vibration. However amplitude and frequency of the vibration movement cannot be varied unless different rollers are used.

The vibration units and the compressor with its air container are controlled from the control desk. The data obtained in test is submitted to the measuring and registering board by means of wire-resistor transmitters which are located at approx 50 points on the vehicle. An oscilloscope of 160 mm screen diameter is fitted to the control desk to supervise the testing. Means are provided for the connection of a registering unit to the measuring and registering board. No further knowledge.

(2) Compensation Measurement Cubicle for Temperature Recording
(see Appendix 'B' attached)

Three cubicles were manufactured in 1953 and were delivered to Moscow, 'AKADEMIE DER WISSENSCHAFTEN', in 1954.

Each cubicle consists of 12 amplifier and power supplies of the push-in type. 12 motor-driven potentiometers are connected to the amplifiers. Two 6-colour temperature recorders are connected to 6 amplifier/power supply units each. Each cubicle therefore is suited for 12 measuring points from whence the data is transmitted to the temperature recorders. To allow for a wider range the follow-system is used whereby the temperature to be expected is fed to the potentiometers and the actual temperature is obtained as the difference from the pre-set value. Total ranges are unknown [redacted] No further knowledge.

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[redacted]

25X1

[redacted] 25X1

(3) Octane Number Measuring Equipment

One unit was delivered to Moscow 'AKADEMIE DER WISSENSCHAFTEN' in 1950.

[redacted] 25X1 There is no registering unit, and one oscilliscope is provided. [redacted] this equipment was still in the development stage and not suited for actual use yet. Extreme difficulties were experienced with this equipment. It was sent back to the works in 1952 for repair. No further details available.

(4) Universal Single Cylinder Diesel Test Stand with Control and Measuring Equipment (see Appendix 'C' attached)

During 1953 the WTB manufactured 11 complete equipments. They were sent to the USSR, Moscow 'AKADEMIE DER WISSENSCHAFTEN' in the same year.

Ten of these equipments were of the type '70' and '110', one of the type '230'. All technical details and illustrations can be gathered from Appendix 'C' attached. No further knowledge.

(5) Piston Temperature Measuring Equipment (see Appendix 'C' attached)

During the year 1954 one complete equipment of the type '70' (see Appendix 'C') was sent to the 'AKADEMIE DER WISSENSCHAFTEN' at Moscow.

Apart from the normal units belonging to this equipment 6 thermo-elements were also attached in the piston of the Diesel engine. Great difficulties were experienced in placing the thermo-elements into the piston and in installing slipring contacts on the crankshaft of the engine. The data transmitted by the thermo-elements was frequently distorted by passing the slipring contacts. After considerable delay the difficulties were overcome. No further knowledge.

(6) Coupling- and Brake Lining Test Stand

From 1951 until 1953 WTB manufactured one complete equipment. It was sent to the Moscow 'AKADEMIE DER WISSENSCHAFTEN' in 1953.

[redacted] no technical knowledge about this equipment, except that the total length is approx 15 m. The coupling lining and the brake lining test stands are divided and are separte from each other. No further knowledge. 25X1

(7) Fiete-Electric Torque Meter (see Appendix 'D' attached)

During 1951 the Moscow 'AKADEMIE DER WISSENSCHAFTEN' ordered one unit which was delivered in 1952.

The equipment consisted of a control desk, an oscilliscope with registering unit and the torque meter which is placed between the engine shaft and the brake. The torque meter is fitted into a steel cylinder with flanges for mounting, fitted to both ends. From each flange a shaft extends into the interior of the cylinder. At its end each shaft carries a slotted disk. The slots of one disk are staggered in respect to the other disk. A number of small bulbs are mounted on one side of the disks to serve as a light source for the photocell. This is of annular construction and is fitted on the other side of the disks. The torque acting on the cylinder results in certain distortion of the same and both shafts turn in opposite direction, being fixed to the flanges and the cylinder ends. Therefore the slots open by a certain amount. The current generated by the photocell serves as an indication of the torque. No further knowledge.

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25X1

(8) Inductance Torque Meter (see Appendix 'E' attached)

This was also an order from the 'AKADEMIE DER WISSENSCHAFTEN', Moscow and was placed in 1951. Date of delivery set was 1954 because extensive research and design was necessary. 6 units were manufactured.

As the photo-electric torque meter this unit also has a cylindrical sheet steel body to which ends flanges are fitted. One long shaft, extending almost from one end to the other, is fixed to one flange. This shaft carries a sleeve to which is fitted a disk. The sleeve slides freely on the shaft in axial direction and is guided by a pin in the shaft. This pin moves in a slot of the sleeve. One end of the sleeve is fitted with a cam on which a roller, fitted to the other flange, is located. The disk is mounted on the other end of the sleeve and, with its circumference, is in the air gap between two inductance coils mounted on the cylindrical body. If the torque meter is under load the disk slides forwards or backwards on the shaft thereby increasing or decreasing an induced current fed to the two coils. The disk movement results from the torsional distortion of the cylindrical body.

This arrangement is designated type 'I', and 4 units were manufactured. Type 'II' is similar in design. Here the cam and roller arrangement is replaced by a saw-tooth like device (see figures 1 and 2 of Appendix 'E'). Two units have been produced of the type 'II'. No further knowledge.

(9) Equipment for the determination of Eddy Formation in Engine Cylinders

This equipment was ordered in 1953 by the Moscow 'AKADEMIE DER WISSENSCHAFTEN', it was delivered in 1954.

The equipment consisted of a glass cylinder in which an electric motor driven piston operated, a control desk, and a xenon arc lamp. When under test artificial snow flakes are introduced into the cylinder instead of the ordinary fuels. The eddy formulation is photographed with the xenon lamp serving as a flash lamp. The camera is of the rapid operation type in order to produce slow-motion pictures. No further knowledge.

(b) 1955 until 1958

(1) DC Amplifiers for Use with an 8-Ray Oscilloscope,
Project Designations: '1/15' and '1/20' (see Appendix 'F' attached)

Development of the DC amplifiers began in 1957 when the order was received by the Moscow 'AKADEMIE DER WISSENSCHAFTEN'. Delivery is scheduled for mid April 1958

Three units were produced.

25X1

The amplifiers are planned to be used with 8-ray oscilloscopes for pressure measuring. The equipment consists of (see Appendix 'F'):

25X1

I = 8 main power supplies

II = 8 amplifiers of the push-in connection type

III = 8 power supplies

IV = 8 power supplies with thermo-elements for temperature stability.

V = 4 current stabilizers.

25X1

25X1

All units are to be equipped with X-ray oscilloscopes and a photo-registering unit in 1958. 25X1 however the order for the construction of these had not yet been given. No further knowledge.

(2) Automatic RPM Meter, Project Designation: 2/28 (see Appendix 'G' attached)

Development of the unit started in 1955. The mandator is unknown The unit comprises a photo-electric transmitter and of a control 25X1 and measuring set. The transmitter works with a light source, the reflected beam from the engine flywheel is directed to a photo-diode. A mark on the flywheel generates the necessary impulses. The control and measuring set 25X1 houses a rpm meter (ampere meter) and six counter valves which are controlled by a multiplying switch. The counting valves are of the PHILLIPS 'E1T' type, but are manufactured in the DDR. The power supply has an operating voltage of 220 Volts AC.

It is planned by the WTB to apply for a patent for this unit. At present there are great difficulties with the electronic counting valves which frequently fail.

25X1

the unit was displayed at the LEIPZIG Industrial Fair in 1957. No further knowledge.

(3) Resistance Pressure Transmitter (see Appendix 'H' attached)

The order was placed in 1954 by the Moscow 'AKADEMIE DER WISSENSCHAFTEN'. 25X1 Date of completion is unknown The unit is planned to be produced in large quantities after sufficient results have been attained. It is to serve as a substitute for quartz pressure transmitters.

The unit is rather small, resembling in appearance a shortened spark plug. A diaphragm is fitted to the lower end, i.e. the end which points into the engine cylinder. A wire resistor is arranged in such a way that a pressure variation produces a variation of the resistance.

Extreme difficulties have been experienced with the diaphragm which is turned at present on a copying lathe. The material used is highly heat-resistant. It is planned, when mass production commences, to press the diaphragms. A patent has been applied for. No further knowledge.

(4) 4-Ray Oscilloscope with Registering Unit

This is a development of the WTB since the oscilloscopes by Dr. MIER, DRESDEN, are hard to obtain and are very expensive. At present a sample unit is under construction. The registering unit has not yet been designed. After completion of the tests 20 units are planned for WTB use. No further knowledge

(5) Octane Number Measuring Equipment (see Appendix 'I' attached)

The equipment has the designation '1/13', it was ordered in Oct 56 by the Moscow 'AKADEMIE DER WISSENSCHAFTEN'. Delivery of the completed equipment was planned to be in Nov 57. Since there are still some difficulties with the mechanical counters the equipment is at present being electrically altered in the works.

As shown on Appendix 'C' the equipment is divided into two units mounted above each other. The lower unit houses the power supply and the necessary

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25X1

amplifier. The upper unit houses the mechanical and electrical counters and the registering unit. Five electronic counting valves are located in a row above 5 mechanical counters. The valves are of the type 'E1T' made by PHILIPS. The mechanical counters are made by a firm, Dr. LANGE, in Berlin-Treptow. Beside the counters there are 2 oscilloscopes of the 2-ray type. One of these gives the diagram in a natural dimension while the second one is used for sectional magnification of the same diagram. Two similar oscilloscopes are mounted in the side of the equipment and are connected in parallel to the other two. They are fitted with a photographic registering unit. Beside the two oscilloscopes on top of the equipment there is a rpm-meter and below a dead-centre indicator.

The ignition diagram is fed to the oscilloscopes via pressure quartz transmitters. The dead-centre indication is obtained by fitting a mechanical/photo-electric rpm meter to the engine shaft. A saw-tooth disk is lighted by a small electrical bulb and the reflections are transmitted by a photocell. The frequency of the photocell is transmitted to the rpm meter in the equipment to indicate the engine rpm. The dead-centre indicator is also connected to the rpm meter on the engine shaft. The saw-tooth disk has a zero mark which is made to correspond to the dead-centre of the engine. To obtain a dead-centre indication as compared to the ignition point the ignition impulse is transmitted to the dead-centre indicator where it is added or subtracted from the original value, the difference is shown in angular degrees. As mentioned above there are some difficulties with the mechanical counters. They have a design frequency of 100 c/s, but the actual frequency is 55 c/s.

25X1

(6) <u>8-Ray Oscilloscope with Registering Unit, Project Designation: '1/17'</u>
(see Appendices 'J_1', 'J_2' and 'J_3' attached)

The 'AKADEMIE DER WISSENSCHAFTEN' in Moscow placed the order in 1950. However the required sensitivity was so high that reductions had to be made when it became apparent that with the equipment available at that time a solution of the problem could not be found. In 1957 the equipment was completed and displayed at the LEIPZIG Industrial Fair. Delivery is planned for June 1958.

The equipment consists of three units:

8-ray oscilloscope with photo-registering unit (Appendix 'J_1')

Control desk (Appendix 'J_2')

Amplifier and power supply (Appendix 'J_3')

The 8-ray oscilloscope consists of 4 high-tension 2-ray oscilloscopes with a registering unit for each oscilloscope. The registering unit operates with Roentgen film on variable speeds either on drums or on film spools. A motor with a gearbox provides for the 4 different speeds. Both oscilloscope and registering unit may be controlled by the control desk which has two control oscilloscopes for supervision. Power supply and amplifier are the same as mentioned in sub-para 6.(b)(5) above.

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an electrometer valve of the type 'T 113' is used with each amplifier. Normal oscilloscopes had been used for preliminary

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25X1

research and design, also for display at the Leipzig Fair. After that high tension oscilloscopes have been installed. unable to provide technical data on the HT oscilloscopes. No further knowledge. 25X1

(7) High Capacity Oscilloscopes with Photo Registering Unit (see Appendix 'K')

Two equipments were delivered in 1956 to Moscow, 'AKADEMIE DER WISSENSCHAFTEN'. A third unit at present is at the WTB for research purposes.

The equipment consists of 4 2-ray oscilloscopes, an amplifer and a delay chain for each oscilloscope, a control oscilloscope, and a common power supply. The control oscilloscope is mounted in the centre of the cabinet. Two oscilloscopes are located at each side. These are fitted into a small compartment with a door to shut off any light. Except to the control tube, an automatic 'PRACTINA' camera is fitted in front of the screen of each oscilloscope. The cameras are equipped with automatic film transport and shutter mechanism. The screen diameter of the tubes is 100 mm. No further knowledge.

(8) 'Bomb', Project Designation: '1/05'

The order was placed in 1954 by the Moscow 'AKADEMIE DER WISSENSCHAFTEN', the equipment was delivered 1957.

The designation 'bomb' was used on the equipment because only the project number was known. The apparatus looks like a diver's helmet, approx 0.7 m diameter. There are two opposing quartz glass windows, they are fitted between outer and inner shell. The space between the shells is used for cooling purposes. The inside chamber, where fuel tests are made, has a cylindrical form. A quartz pressure transmitter is fitted to the inner shell. An oscilloscope with a registering unit is fitted to a strioe measuring apparatus to record the test data. A delay chain is used on the oscilloscope. The strioe measuring apparatus has a length of approx 5 m and a width of approx 3 m. It moves on rails to permit access to the 'bomb'. A control desk accommodates the oscilloscope and the registering unit.

The equipment is used for fuel testing. No further knowledge.

(9) Torque Motors

At present 10 inductance torque meters are under construction at WTB. The mandator is unknown They are of the same type as described in sub-para. 6.(a)(8). However the lengths vary. The order was given in 1957, at present calibrations are made. Date of delivery and destinations are unknown. No further knowledge. 25X1

(10) Universal Single Cylinder Diesel Test Stands, Project Designations: '1/03' and '1/04' (see Appendix 'C' attached)

Two complete equipments were manufactured in 1957, type designation is unknown . Mandator is the Moscow 'AKADEMIE DER WISSENSCHAFTEN'. Both units are still at WTB. Date of delivery is unknown. 25X1

Technical details and data can be gathered from Appendix 'C'. Additionally each equipment is equipped with various cylinders of different sizes. A photo-electric dead centre indicator is also supplied. No further knowledge.

[redacted] 25X1

[redacted] 25X1

(11) Torsional Oscillating Transmitter (TORSIONSSCHWINGUNGSGEBER)

Research and development began in Oct 57. The mandator is unknown [redacted] 25X1 [redacted] the 'AMT FUER TECHNIK' is very much interested in the equipment. Purpose of the equipment is unknown. 25X1

The research and development met with extreme difficulties. To date 3 different units have been constructed and tested. Only the last met all requirements. The design is based on a flywheel effect, i.e. a flywheel mass is damped by springs and is connected to the core of an induction coil. The data is fed to an amplifier. The type of registering or evaluating the data is not known [redacted] No further knowledge. 25X1

(12) Octane Testing Engine

In 1958 the WTB received from the SCHOENEFELD airport an octane testing motor. The equipment is an old American design, the motor being a 'CFR' motor. The equipment was sent to the WTB for overhaul and calibrating. No further knowledge.

(13) 'SICHTPEILEMPFAENGER'

In Jan 58 the WTB received an order from VEB RFT KOMPENIK for the manufacture of chassis for a 'SICHTPEILEMPFAENGER' (VHF direction finder ?). The order was classified as most urgent since the completed equipment has to be delivered by Mar 58, probably to the USSR. [redacted] 25X1 From Jan 58 until Feb 58 sixty chassis for power supplies were manufactured in the works. This included only mechanical work. Electronic parts were to be installed by RFT KOMPENIK. No further knowledge.

(14) Diesel Engine Control and Reversing Equipment

In Jan 58 the works were approached by VEB WTBG III to discuss the planned production of diesel engine control and reversing equipment. This equipment was designed by the WTBG III and first tested on the freighter 'WERDER'. At present WTBG III has 3 units under construction the 3rd of which is to be used as a sample unit for WTB IV. WTB IV received an order for 4 of these units. They are to be completed by mid 1958. In Feb 58 an engineer PIERSCH fnu, went for one week training to WTBG III, he will later supervise production at WTB IV. A master mechanic STEDRING, fnu, will be responsible to PIERSCH for the production.

When PIERSCH was at WTBG III he was told to especially watch for the ratchet locking mechanism of the unit. During testing of the first unit this had been particularly subject to frequent failure. In early Mar 58 the gearbox castings (aluminium) were received by WTB IV for further processing. No further knowledge.

(15) Universal Single Cylinder Diesel Test Stand (see Appendix 'C' attached)

In Dec 57 one equipment has been completed, type is unknown [redacted] Mandator is VEB BERLINER VERGASERWERK. No further knowledge.

(16) Universal Single Cylinder Diesel Test Stands with Air Consumption Meters

In spring 1957 2 equipments were delivered to China. Apart from the conventional design these were equipped with air consumption meters. Mandator and

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[redacted]

25X1

[redacted]

final destination are unknown [redacted] 25X1

(17) Universal Single Cylinder Diesel Test Stand with Air Consumption Meter

Approx 8 weeks after the equipment mentioned in sub-para 6.(b)(16) above had been delivered another unit of the same type was sent to the 'TECHNISCHE HOCHSCHULE' DRESDEN. No further knowledge.

(18) Power Supply and Ignition Equipment for Xenon Arc Lamp (see Appendix 'L')

In 1955 one complete equipment was sent to the USSR, mandator apparently the Moscow 'AKADEMIE DER WISSENSCHAFTEN'.

A second equipment had been ordered in 1957, it was completed in Dec 57. The equipment has not yet been delivered. The latter project has the project designation I/03 [redacted] not certain whether there exists any connection between the 'universal single cylinder Diesel test stands' mentioned under sub-para. 6.(b)(10) above). 25X1 25X1

The equipment consists of a xenon arc lamp with power supply and control equipment. The arc lamp is shown on Appendix 'L'. Its bulb is made of very thick quartz glass, the thickness is not known [redacted] no knowledge of power supply and/or operating voltages used in the equipment. It is said in the works that this equipment is used with photographic or spectographic apparatus No further knowledge. 25X1

(19) Probes (SONDEN). Project Designation: '2/45' (See Appendices 'M_1' and 'M_2')

In Jan/Feb 57 a Dipl-Physiker PESCHKE, fnu, and a mechanic GNEVKOW, fnu, were sent to FRIEDRICHSHAGEN for training on probe manufacture. PESCHKE stayed for 8, GNEVKOW for 4 weeks, both came back simultaneously in Mar 57. They occupied a small laboratory where probes were manufactured. The mandator is unknown [redacted] the production of the probes and their purpose is regarded as 'secret'. 25X1

The probes are 80 mm long with an outer diameter of 4 mm and an inner diameter of 3 mm. They consist of a porcelain body with those dimensions with two separate coils of copper wire wound onto them. To date approx 50 probes have been produced. They are installed into amplifier units as shown on Fig.2 of Appendix 'M_1', two in a row. One probe is fitted with a sheet metal adjustable core, approx 40 x 3 x 0.5 mm. The core is adjustable from the outside of the equipment. The equipment also houses a power supply unit. It appears as if the complete equipment is totally self-contained. A number of [redacted] is also contained in the equipment which has to be applied to facilitate carrying. A prototype of the equipment has been operated at VEB IV in Jan 58. 25X1

In Dec 57/Jan 58 and in early Mar 58 an advertisement appeared in the DDR newspaper 'BERLINER ZEITUNG':

"VEB fuer Kraftmotorenbau

Berlin-Adlershof
Rudower Chaussee 26-30

Wir suchen fuer unsere Nebenstelle in Friedrichshagen:

1 Mechanikermeister

[redacted]

25X1

[redacted] 25X1

1 Mechaniker

1 Schaltmechaniker

(for our branch works at Friedrichshagen are required: 1 master mechanic, 1 mechanic, 1 diagram mechanic)" 25X1

[redacted]

(20) Control and Calibration Equipment for Aircraft Instruments

On 10 Mar 58 the WTB IV was visited by a Major (?) of the EGAF. He had a discussion with a BIRNBAUM, fnu and one Gerhard GRENZ of the works. A few days later an order for the development of control and calibration equipment was received. [redacted] 25X1

The control and calibration equipment which will be used on aircraft instruments will consist of two separate units. [redacted] no knowledge 25X1
about the equipment or the instruments to be controlled and calibrated. [redacted] 25X1
[redacted] the equipment will be used before take-off to check some 25X1
aircraft instruments.

The prototype of each unit is scheduled to be completed by Jun 58, after that date mass production is planned. No further knowledge.

(21) Control Desks for Aircraft Engines

In Jan 58 an order for 2 control desks for aircraft engines was received. Mandator is VEB INDUSTRIEWERK LUDWIGSFELDE. The order is very urgent. Delivery for the first control desk is planned for mid Mar 58, for the second one Jun 58 is scheduled. The urgency of the order raised astonishment when it was learned in WTB IV that the test stands for which the control desks are designed will not be completed until 1959.

[redacted] No further 25X1
knowledge.

(22) Instrument Panels for EGW (see Appendix 'N' attached)

VEB INDUSTRIEWERK LUDWIGSFELDE ordered, in summer 1957, 20 instrument panels for ship's Diesel engines. They were manufactured and delivered in October 1957.

Each instrument panel is fitted with 20 temperature indicators. Range from 0° to 500° Centigrade. Each panel also is equipped with two other instruments [redacted] 25X1

Each temperature indicator is connected to a thermo couple (see Fig.1 on Appendix 'N'). Teh temperature indicators are supplied by VEB MESSGERAETE-WERK KARL-MARX-STADT.

Extreme difficulties were experienced with the temperature indicators.

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25X1

At certain speeds or resonant frequencies the indication failed because of sticking of the pointers. A complaint of this nature was received from ROSTOCK and a colleague of WTB was sent to repair any defects. In ROSTOCK this man learned that the instrument panels were installed into MTBs of the SKN. He was not allowed to go on board. The defective units were sent back to the WTB where they were repaired.

To overcome future difficulties WTB ordered VEB MESSGERAETEWERK KARL-MARX-STADT to develop a new type of temperature indicator which will meet the requirements. An order for 500 more temperature indicators, i.e. 25 instrument panels, has been stopped by VEB INDUSTRIEWERK LUDWIGSFELDE until difficulties have been overcome and the new type of instrument, which is to have a plastic housing, will be available. No further knowledge.

(23) Aircraft Engine Test Stands and Control Boards (see Appendices 'O_1' and 'O_2' attached)

In 1957 an order for the development and construction of 4 aircraft engine test stands and control boards was received from PIRNA. Exact mandator is not known The equipment was supplied in Dec 57, the equipment is at present stored 'near PIRNA'. The order was handled as 'most urgent'. 25X1

Each equipment consists of 3 units:

Control board
test stand
fuel, oil, water tanks in a common frame.

As shown on Appendix 'O_1' the control board has a window-like opening. On one side of it are 20 temperature indicators as described in sub-para 6.(b)(22) above. On the other are 20 other instruments, circular 25X1
Above the window are approx 8 pressure gauges, 25X1
below are approx 8 retary switches, their purpose is also unknown.

The engine test stand resembles a nose cone of approx 1.5 m diameter and 3 m length and is mounted on 3 struts which are lined with sheet metal to reduce air drag. Inside the 'nose cone' engine mount are a number of devices which are connected to the engine to be tested. They are used to control the engine. The engine itself is mounted on a 40 mm thick plate at the flat end of the 'nose cone'.

Fuel, oil, and water tanks are mounted in a common frame approx 2.5 m square, and 3 m high. Pumps are provided to serve the engine when under test. A 'RAPIDO' scale is used to determine fuel consumption. It is also housed in the frame. No further knowledge.

(24) Test stands to be erected at WTB IV, Project Designations: '2/11'; '2/13'; '2/14'; '2/15'

Since Jul 57 4 test stands are under construction at WTB IV. Date of completion is unknown The test stands will remain in the works 25X1
to conduct research on various engines of DDR manufacture.

no technical knowledge about the project. No further 25X1
knowledge.

25X1

25X1

(25) Vibration Table

In Jan 58 WTB received an order for the development and construction of a vibration table. Mandator, date of completion, and destination are unknown

25X1

At present the table is still on the draughting boards. It is to have sine-curve movements in all directions including rotation of the table. Frequency, amplitude, and angle of declination are to be variable during operation. the 25X1 table will be used to test very delicate instruments. No further details available.

(26) Anemometer (see Appendices 'P_1' and 'P_2' attached)

This project belongs to the 'Flame Tube' (see sub-para 6.(b)(27) below) described in the following sub-para. The first designs were worked out in summer 1957, however, they were discarded due to mechanical complexity. The latest design was completed on Mar 15, 1958 The 25X1 anemometer serves to measure air velocities in tubes and is intended to 'cold-test' the flame tube.

The anemometer consists of a brass tube which may be rotated through 360°, and has vertical movement of 100 mm. The lower end of the tube is fitted with a glow-filament. When heated and submitted to flowing air the current flowing through the filament is altered thereby giving an indication of the air velocity. All technical details may be gathered from Appendix 'P_1' attached. The testing of the anemometer was done on the arrangement shown on Appendix 'P_2' attached. A compresser is connected to a boiler from the upper end of which extends a rectangular tube, 8 x 8 cm to which the anemometer is mounted.

At present a new design is being worked out to permit the use of the anemometer during actual operation of the flame tube. Due to the high temperatures to be expected the original has to be re-designed. No further knowledge.

(27) 'Flame Tube', Project Designation: '1/06' (see Appendices 'Q_1' to 'Q_5'

The project started in Jan 56 when 'AKADEMIE DER WISSENSCHAFTEN' in Moscow gave the order to design and construct an apparatus for the testing of various fuels. The equipment, now called 'flame tube', was completed in Mar 58. It will be delivered to the USSR in mid 1958 when final testing has taken place.

A Russian delegation arrived, in Dec 57, from Moscow to inspect and 25X1 test the flame tube. They were in civilian clothes. a new order for a further two units was placed, in Mar 58, for the USSR.

Apart from this there is considerable Chinese and 'AMT FUER TECHNIK' interest in the subject. It is expected in the WTB that orders from these sides will also be placed.

From Dec 57 until Mar 58 various fuel tests have been made to determine the usablity of the apparatus. 25X1 it was learned that during these tests a selection of fuels were used. Test series included petrol, Diesel oil, also 25X1 petrol with various water contents, and petrol with various alcohol contents.

200 grams, approx, of each fuel type were used in each fuel test.

The apparatus consists of a double-mantlet steel tube with an asbestos insulation between the mantlets. The tube has an inner diameter of 100 mm and is approx 5 m long. A 3-stage air heater is fitted to the front end of the tube, the rear end leads to the atmosphere. The air heater (see Appendix 'Q_5') is made up of 3 separate tubes each containing 10 electrical heater elements of 1 Kw output each. Total capacity therefore is 30 Kw. The air heater is connected on the other side to a compressor unit. Maximum air temperature is 600° Centigrade. Between air heater and flame tube there is a motor-driven air volume control valve. Approx 1 m behind the junction of air heater and flame tube there is a fuel injection nozzle which is connected to a fuel tank located above the flame tube. (see Appendix 'Q_1') Approx 0.5 m away from the fuel injection nozzle a spark plug and a thermometer are mounted to the flame tube. They are approx 200 x 70 mm, and are fitted on both sides of the tube. Attached to each quartz window is a lens housing. One housing contains 5 bi-convex lenses mounted in a row, each lens has a prism attached to it to deflect the light originating from a synchronous spark gap through a mirror system. The other lens housing contains 9 bi-convex lenses of which 5 are in one row, and, staggered, 4 in another. On this side there is a small cubicle containing a film drum with an electric motor connected to the film drum by a gearbox to allow for various speeds of the drum. Normal drum speed is 3,000 rpm. A slotted aperture and electro-magnetic shutter are arranged between the film drum and lens housing (see Appendix 'Q_2') The film drum measures 40 x 40 cm. An anemometer is arranged in the flame tube behind the quartz windows.

Operation of the Flame Tube (see Appendix 'Q_3')

The air volume and temperature are set to the desired values by the 3-stage air heater and by the air volume control valve. After the desired air flow has been established, see 'A' in sketch, the fuel is injected by the nozzle 'B'. The synchronous spark gap 'E' and the spark plug 'C' are then ignited simultaneously, the explosion takes place between the quartz windows at 'D'. The light of the synchronous spark-gap is deflected by the mirror system 'F' and directed to the prism/lens arrangement at 'G' from whence it is sent through the tube and through the lenses at 'K' and through the aperture at 'M' to the film drum 'N'. The light generated by the fuel combustion is sent, through the lenses at 'L', to the aperture to the film drum.

The resultant diagram is shown in Appendix 'Q_4'. The light marks of the synchronous spark-gap are arranged in a row due to their simultaneous origin. This light also easily penetrates the light generated by the fuel combustion. The 4 light marks of the fuel combustion do not show in a row on the film because of the speed of the combustion. This effect is generated by the speed of the film drum. The intensity of the film exposure and the location of the various marks shows the combustion speed and the effectiveness of the fuel (calory content).

The operation of the flame tube is controlled by thyratrons, the fuel is automatically weighed by a photocell connected with a small scales. The electro-magnetic shutter of the film drum is opened prior to ignition. The flame extending from the exhaust side of the flame tube is approx 2 m long and of a white-yellow colour.

There have been some difficulties with the quartz windows during testing of the apparatus, they were blown out a number of times. The windows are

ILLEGIB

25X1

25X1

it is a laboratory on its own. The new designation is 'ZENTRALES KLIMAPRUEFFELD (ZKP' of the DDR. It was erected in 1955 and until 1958 worked with the WTB. It is controlled directly by a Ministry (25X1
) Leading personalities are: 25X1

STRAUCH, fnu, Dipl-Chemiker

WINTER, fnu, Dr. der ZOOLOGIE

The tests carried out are:

mechanical testing of all kinds, testing of paints and lacquers, sea-water testing of various materials, humidity testing (especially for expert items), and termite testing. For the latter purpose a new termite building was constructed in 1957. No further knowledge.

12. Military Research at WTB 25X1

The head of the dept. is a BELZ, fnu. He is frequently visited by EGA officers in uniform, ranks and units are unknown 25X1
Also WEBER of the 'AMT FUER TECHNIK' is very much interested in the department. No further knowledge. 25X1

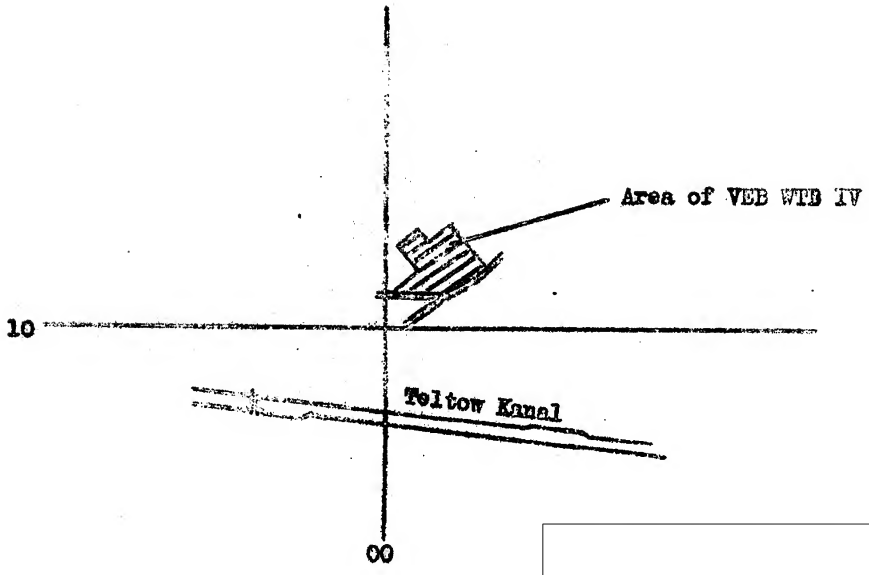
End of Report

R/113/9
DJ/AS/2

25X1

Appendix "A" 25X1

Subject: Some Projects of VEB WTB IV



25X1

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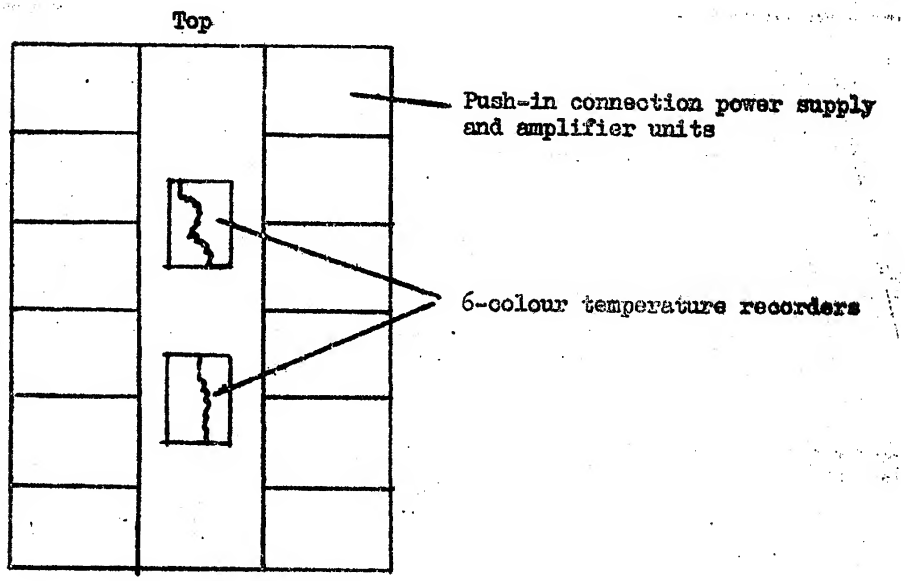
Appendix "B"

Subject: Some Projects of VEB WTB IV

COMPENSATION MEASUREMENT CUBICLE
(Temperature Recorder)



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CONFIDENTIAL

Universal-Einzylinder-Prüfstand

Von J. BASTIN, Berlin

DK 621—57:061.6:62

Auf vielen Gebieten der Technik ist der praktische Versuch als Hilfsmittel der theoretischen Entwicklung und Forschung wie zur Erprobung ausgeführter Konstruktionen unentbehrlich. Die Motoren- und Zubehörteile mit ihren zahlreichen extremen, einander vielfach widersprechenden Bedingungen sind heute nur mit vollwertiger Prüfstandseinrichtung zur Lösung der ihnen gestellten Aufgaben imstande. Ein Großteil der erforderlichen Untersuchungen, wie über die Gestaltung von Zylinder, Kurbeltrieb und Steuerung, Fragen der Füllung und Kraftstoffversorgung, Kühlung und Schmierung, Einfluß von Temperatur, Verdichtungsgrad und Druck der Ladeluft u. a. werden dabei am vorteilhaftesten am Einzylinderprüfmotor vorgenommen. Nicht nur durch höhere Wirtschaftlichkeit, sondern auch durch vereinfachten baulichen Aufwand und größere Anpassungsfähigkeit an sich laufend wechselnder Aufgaben ist dieser als Versuchsgerät dem Vollmotor überlegen. Die Ausschaltung unkontrollierbarer Störeinflüsse von Nachbar-Zylindern und Hilfsgeräten gewährleistet in Verbindung mit dem robusten Aufbau die Gewinnung reproduzierbarer Versuchsreihen, wie sie mit ähnlicher Genauigkeit beim Vollmotor trotz wesentlich erhöhtem Zeitaufwand oft gar nicht zu erreichen sind, man kann behaupten, in manchen Fällen beim Vollmotor nicht durchführbar sind.

Der Einzylinderprüfstand ist in seiner Konstruktion und Anlage auf die besonderen Erfordernisse des Automotorenbaues abgestimmt. Er eignet sich wei er zur Untersuchung jeder beliebigen anderen Triebwerkseinheit entsprechender Größenordnung. Die Aufteilung der Anlage in eine Anzahl selbständiger Gerätegruppen erlaubt weitgehende Anpassung an örtliche Gegel enheiten und jeweils wechselnde Versuchsaufgaben, ohne daß dadurch die Übersichtlichkeit des Gesamtaufbaues leidet. In engster Fühlung mit der Praxis entwickelt und ergänzt, hat sich der Prüfstand auf allen Gebieten der Motorenforschung in vielen Exemplaren verschiedener Art und Größe bestens bewährt. Besonders hervorzuheben ist, daß bei diesen Einzylinderprüfmotoren die Veränderung des Verdichtungsverhältnisses und die der Steuerzeiten, während des Motorlaufes stufenlos verstellt werden können. Die Verstelleinrichtung für die Steuerzeiten stellt in ihrer Ausführung etwa vollkommen Neues dar und ist organisch im Einzylinderprüfbock eingebaut. Durch diese Anordnung bleibt der Zylinderkopf frei (gegenüber der bekannten DVL-Ventilsteuerung, die unmittelbar auf dem Zylinderkopf oder — bei stoßstangenbetätigten Ventilen auf dem Zylinderträger befestigt werden) und gestattet durch diese Zugänglichkeit den Einbau von Sondermeßeinrichtungen.

Der Einzylinderprüfmotor findet auch seine Verwendung als Kraftstoffprüfmotor mit einem vom WTB entwickelten Klopfmeßgerät.

Aufbau der Anlage

Das wichtigste Bestandteil der WTB-Universal-Einzylinder-Prüfanlage:

I. der Einzylinderprüfmotor. Darüber hinaus umfaßt die An-lage für die Betriebsfähigkeit folgende Baugruppen.
II. Bremsanlage und Leistungsmessung.
III. Aufstellung der Prüfstands anlage.
IV. Bedienungs-Meß- und Überwachungseinrichtungen:
a) Meß- und Steuerpult (Bedienpult),
b) Kraftstoffversorgung mit Meßeinrichtung,
c) Kühl- und Schmierstoffversorgungs-Kühlanlage,
d) Luftverbrauchs-Meßanlage für Verbrennungsluft,
e) Abgas-Absauge anlage,
f) Oszillographierungsanlage.

Dem gemeinsamen, sachgemäßen Aufbau von Motor und Bremsmittel dient ein Fundament, daß je nach Bedarf als Einzel- oder Doppelstand-Fundament ausgeführt werden kann.

Beschreibung und Arbeitsweise

I. Universal-Prüfmotorenbock

Der WTB-Universal-Einzylinderprüfbock (im folgenden kurz als EZP bezeichnet) ist unter Auswertung langjähriger Erfahrungen im Versuchsbetrieb entwickelt und den Bedürfnissen der Gegenwart angepaßt. Als vielseitig verwendbares Versuchsgerät ist er zur Untersuchung flüssigkeits- und luftgekühlter Zylinder von 0,2 bis 2,0 l Zylinderhubraum eingerichtet und überbrückt bei einer Höchstdrehzahl von $n = 4000$ U/min fast den gesamten für Automobilmotoren praktisch in Betracht kommenden Bereich. Er wird z. Z. in folgenden Ausführungen hergestellt:

Ausführung 70	von	0,2	bis	0,8	1 Zylinderhubraum
Au führung 110	von	0,4	bis	2,0	1 Zylinderhubraum
Ausführung 230	von	—	bis	12,0	1 Zylinderhubraum

Im übrigen kann für Entwicklungszwecke der Prüfbock auch ohne Zylinderaufbauten geliefert werden.

Der EZP besteht im wesentlichen aus dem Unterbau und den auswechselbaren Zylinderaufbauten.

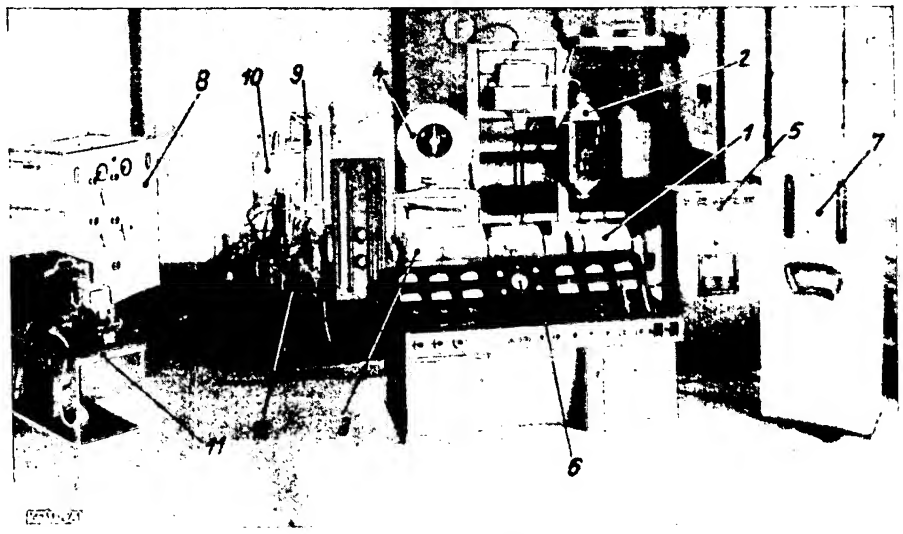


Bild 1. Einzylinder-Prüfanlage

1 Umformersatz
2 Stern-Dreieck-Schaltergruppe
3 Pendelbremse
4 Drehmomentenwaage
5 Thyratron-Regelanlage
6 Meß- und Steuerpult
7 Kraftmeßanlage
8 Kühlmittelanlage
9 Luftmengenmeßanlage
10 Abgas-Absauganlage
11 Oszillographierungsanlage
12 Universal-Einzylinderprüfmotor

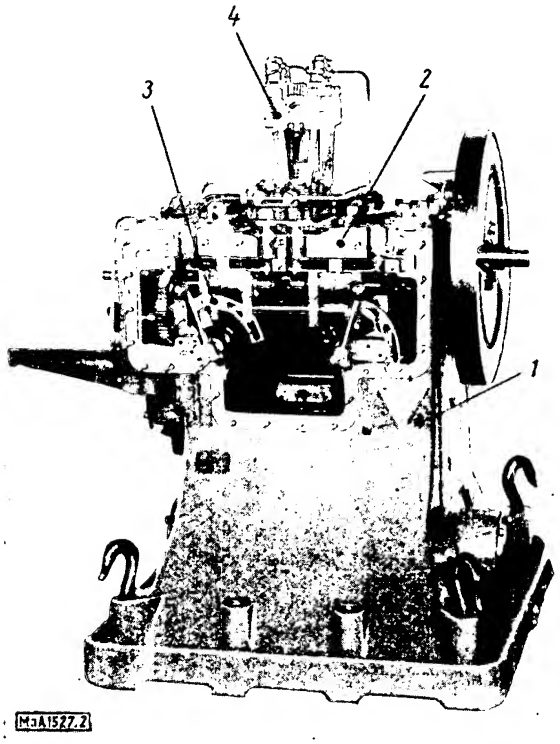


Bild 2. Einzylinderprüfbock, Ausführung 70, mit luftgekühltem Zylinderaufbau
1 Gehäuseteil
2 Gehäuseoberteil
3 Steuerzeiten-Verstellung
4 Luftgekühlter Zylinder (Diesel)

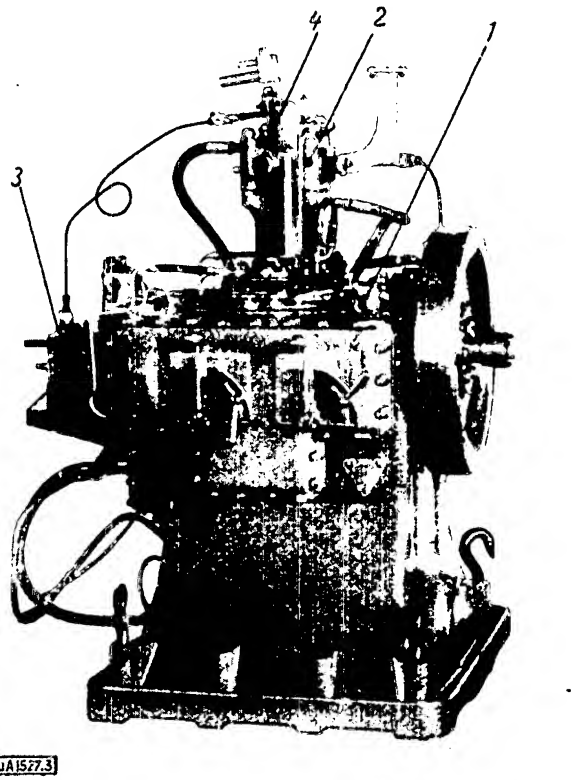


Bild 3. Einzylinderprüfbock, Ausführung 110, mit flüssigkeitsgekühltem Zylinderbau
1 Spezial-Zylinderkopf (Diesel)
2 Fassung für Quarzfenster
3 Einspritzpumpe
4 Verstellungsantrieb für die Verdichtung

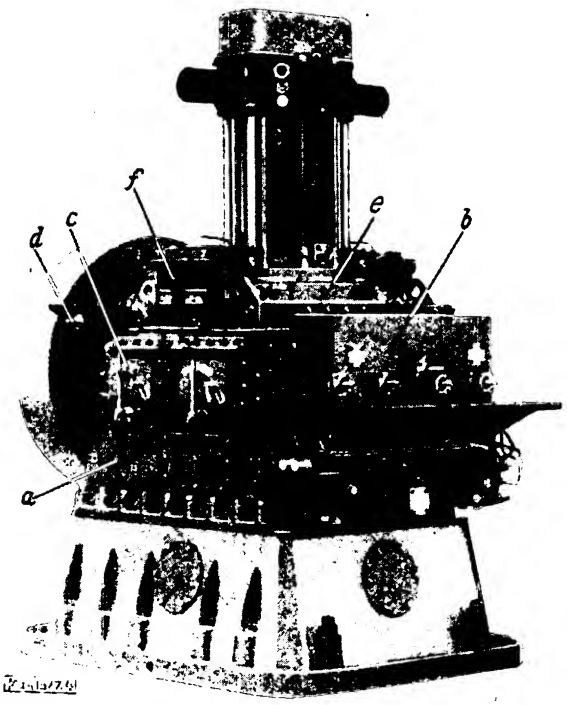


Bild 4. Einzylinderprüfbock, Ausführung 230 *n* = 1500 U/min max.
a Kurbelwellengehäuse
b Apparateteil
c Verstelleinrichtung für Steuerzeiten
d Verstelleinrichtung für Verdichtung
e Verstellplatte—Zylinderträger
f Nockenkasten

Aufbau des Prüfmotorenbocks

Das Gehäuse, der tragende Teil des Prüfmotorenbocks, ist in Gußeisenkonstruktion ausgeführt. Es ist nach allen Seiten öldicht abgeschlossen und besitzt infolge kräftiger Verrippung eine große Steifigkeit. Beiderseits angebrachte, abschraubbare Deckel ermöglichen den Zugang zum Nockenwellenantrieb und zu der Nockenwellenverstelleinrichtung. Die obere Hälfte des Gehäuses ist wie die Kurbelwanne eines Vollmotors als Sammelraum für das von dem Lager abtropfende Öl ausgebildet. Zur Entlüftung ist seitlich ein Rohr angeflanscht mit einem gegen Verunreinigung aufgesetzten Luftfilter. Weiter ist am Gehäuse, auf der dem Schwungrad gegenüberliegenden Seite der Apparateteil angeflanscht. Er umschließt das für den Antrieb der erforderlichen Hilfsgeräte notwendige Getriebe. Am Apparateteil ist ein Konsol zur Aufnahme der Hilfsgeräte, wie Einspritzpumpe, Zündmagnet u. a. angebracht. Für die Befestigung des Motorbocks sind acht Bohrungen vorhanden.

Kurbelwelle, Kurbelwellenhauptlager

Die Kurbelwelle ist geteilt ausgeführt, um Zwischenstücke mit verschiedenen Kurbelkröpfungen und Gegengewichten, entsprechend den unterschiedlichen Zylinderaufbauten (Hub) verwenden zu können. Die Lagerung der beiden Kurbelwellenteile erfolgt in Bleibronze-Gleitlagern, ein evtl. auftretender Achsschub wird durch ein auf der Räderkastenseite befindliches Paßlager aufgenommen. Die Verbindung des Kurbelwellenmittelstückes mit den beiden Kurbelwellenteilen erfolgt durch Flanschverbindungen. Die Abdichtung der Kurbelwelle nach außen ist schwungradseitig durch ein Ölrückfördergewinde, auf der Räderkastenseite durch einen Dichtungsring gewährleistet.

Antrieb der Steuernocken, Verstellung der Steuerzeiten

Links und rechts von der Kurbelwelle befindet sich je eine Welle mit Keilwellenprofil zum Antrieb der Steuernocken. Über Zwischenräder mit der Kurbelwelle verbunden und über nachfolgende Zwischenräder und Kegelradpaare werden von

jeder dieser Wellen zwei Steuernocken angetrieben, so daß der jeweils zu prüfende Zylinderaufbau mit insgesamt vier Ventilen arbeiten kann, entweder in hängender oder stehender Anordnung. Der Antrieb erfolgt mit halber Kurbelwellendrehzahl für Viertaktmotoren, kann aber auch in Sonderfällen auf Kurbelwellendrehzahl umgebaut werden. Jedes der Ventile kann in den Steuerzeiten einzeln verstellt werden. Die Getrieberäder haben eine Schrägverzahnung, so daß bei einer axialen Verschiebung des auf der Keilwelle sitzenden Rades (über einen Hebelarm von außen mit dem dafür angebrachten feststellbaren Verstellhebel) eine Verdrehung der Nocken

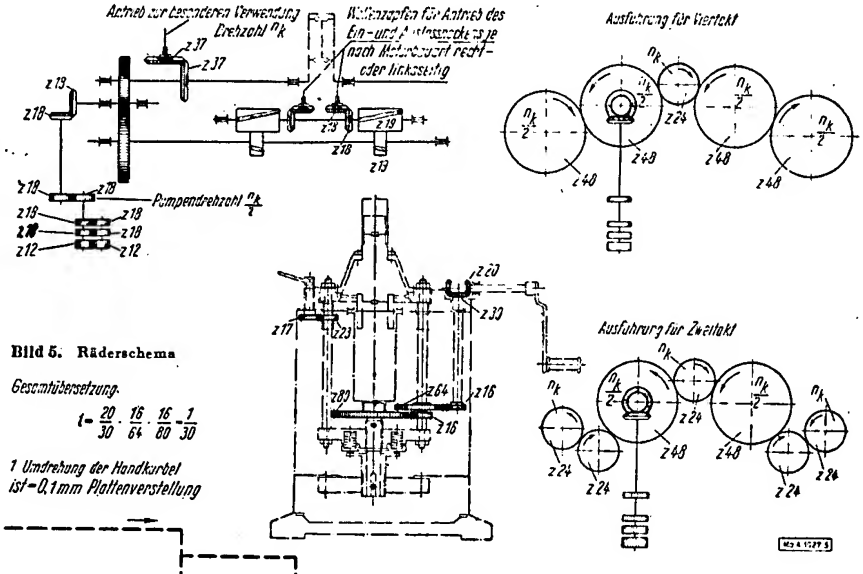


Bild 5. Räderschema

Gesamtübersetzung

$$i = \frac{20}{30} \cdot \frac{16}{64} \cdot \frac{16}{80} \cdot \frac{1}{30}$$

1 Umdrehung der Handkurbel ist = 0,1 mm Plattenverstellung

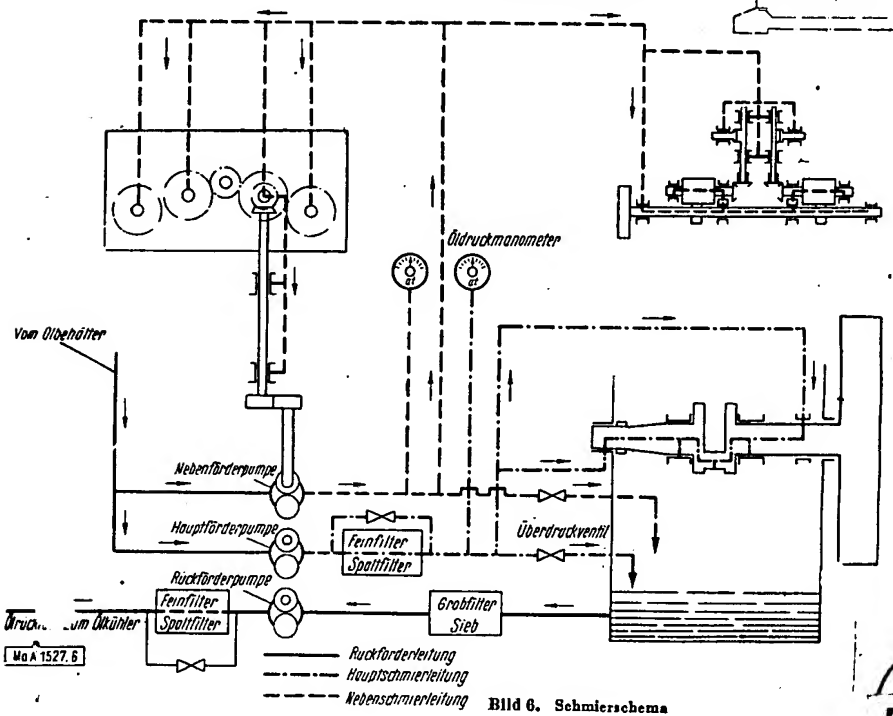


Bild 6. Schmierschema

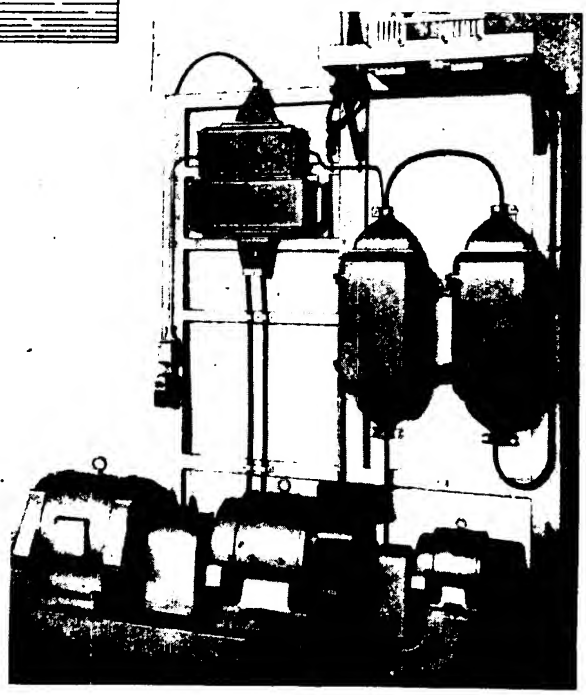
angezeigt, so daß man jeweils eingestellte Werte wiederholen kann.

Die insgesamt mögliche Verstellung beträgt max. 35 mm. Damit die Genauigkeit der Einstellung nicht durch Spiel in den Gewindegängen beeinträchtigt wird, sind Druckfedern mit entsprechender Vorspannung eingebaut. Das Feststellen der Verstellplatte (Zylinderträger) erfolgt durch vier Klemmkegel, die über Zahnräder mittels Steckschlüssel angezogen und festgestellt werden.

Schmierung

Der Universal-Einzylinderprüfmotor besitzt eine Druck-

Bild 7. Umformergruppe mit Stern-Dreieck-Schaltergruppe



gegenüber der Kurbelwelle erfolgt und somit eine Verstellung der Steuerzeiten erreicht wird. Die größtmögliche Verstellung beträgt ± 30° Kurbelwinkel. Falls der Zylinderaufbau nur ein Einlaß- und Auslaßventil hat und die Stoßstangen auf einer Seite angeordnet sind, dann können am Prüfbock die nicht benötigten, somit leer mitlaufenden Nocken durch Herausnahme des auf der Keilwelle sitzenden Zahnrades stillgesetzt und somit die Reibungsleistung verringert werden.

Verstellung der Verdichtung

Den oberen Abschluß des Prüfbocks bildet eine starke Platte, die zugleich als Zylinderträger dient. Die Platte selbst ist durch die beiderseits am Prüfbock heraustretenden Wellenenden, die mit einem Vierkant versehen sind, durch aufsteckbare Handkurbel über Stirnräder, Spindeln und Gewinde in ihrer Höhe verstellbar. Da Triebwerk, Kurbelwelle, Pleuel und Kolben hierbei in ihrer Lage unverändert bleiben, so ist die Höhenverstellung des Zylinders einschl. Zylinderkopf gleichbedeutend mit einer Veränderung des Kompressionsraumes und damit des Verdichtungsverhältnisses. Eine Umdrehung der Handkurbel bewirkt eine Höhenverstellung um 0,1 mm. Die Umdrehungen werden über ein Zählwerk

umlaufschmierung. Das Schmieröl wird von einem Ölbehälter über eine durch die Kurbelwelle angetriebene Zahnradpumpe direkt an die Schmierstellen, wie Hauptlager, Getriebe und Steuerung herangeleitet. Innerhalb des Prüfbocks sammelt sich das Rücklauföl, wird über Spaltfilter gereinigt und wieder in den Ölbehälter zurückbefördert. Die Einstellung des erforderlichen Öldruckes erfolgt durch einstellbare Druckregelventile, die sich am Filtergehäuse befinden.

II. Bremsanlage und Leistungsmessung

Die Belastung (Abbremsung des Einzylindermotors) kann grundsätzlich mechanisch, elektrisch oder hydraulisch erfolgen.

Die mechanische Bremsung wird wegen zu großer Fehlerquellen selten angewandt.

Eine hydraulische Bremsung (Wasserwirbelbremse) bietet den Vorteil niedriger Anlagekosten, geringen baulichen Aufwands und kleineren Raumbedarfs. Als nachteilig für den vorliegenden Verwendungszweck hat sich neben einer gewissen Instabilität dieser Bremse die Drehzahlabhängigkeit ihres Drehmomentes erwiesen. Die Notwendigkeit zur Inbetriebsetzung eines jeweiligen Prüflings ohne Startvorrichtung ist nicht möglich. Hierzu müßte eine besondere Anwurf- oder Andrehvorrichtung angebracht werden. Eigenreibungsmessungen (Reibleistung) N_r lassen sich mit der Wasserwirbelbremse ebenfalls nicht durchführen.

Die elektrische Bremsung mit Pendelgenerator [1]) (Bild 8) vermeidet alle diese Nachteile. Sie gilt daher, besonders in Verbindung mit einem Leonardsatz [2]) (Bild 7) (Umformer[3]), als das neuere Bremsverfahren, erfordert allerdings einen nicht unerheblichen baulichen Aufwand, der auch in den Anschaffungskosten zum Ausdruck kommt, sich aber durch die Rückgewinnung der sonst nutzlosen in Wärme verwandelten Bremsenergie wieder bezahlt macht.

Elektrische Bremse

Als Normalausrüstung für den EZP wird eine elektrische Bremsanlage mit einer zum EZP ausreichenden Leistung und Drehzahl gewählt. Die Belastung der üblich mit dem Motor durch eine Gelenkwelle [4]) gekuppelten Pendelmaschine erfolgt dabei nicht durch Widerstände, sondern in Leonard-Schaltung durch einen an das Drehstromnetz angeschlossenen Gleichstrom-Drehstrom-Umformersatz, mit den sich daraus ergebenden Vorteilen:

a) Die vom EZP aus dem Kraftstoff gewonnene Energie wird nicht nutzlos vernichtet, sondern nutzbringend ins Drehstromnetz geleitet.
b) Unabhängig von der Drosselstellung bleibt die eingestellte Motordrehzahl ziemlich konstant, sie wird ausschließlich elektrisch durch die Veränderung des Erregerstromes geregelt. Eine Änderung der Motorleistung hat nur geringen Einfluß auf die Drehzahl, aber verursacht eine Veränderung des Drehmomentes.
c) Bei vorübergehender Unterbrechung von Zündung oder Kraftstoffzufuhr läuft der Motor mit geringem Drehzahlabfall weiter, indem die Pendelmaschine selbsttätig vom Generator- zum Motorbetrieb übergeht. Die notwendige Antriebsenergie wird dabei aus dem Drehstromnetz bezogen, wobei die übrigen elektrischen Maschinen ihre Funktion umkehren.
d) Bei auftretendem Motorschaden kann eine sofortige Notbremsung durch einen in dem Bedienpult eingebauten Druckknopf über den Notbremsenschalter erfolgen, der die Pendelmaschine vom Umformer abschaltet und durch Bremswiderstände den Ankerstrom unterbricht.
e) Beim Anlassen und zur Ermittlung der Reibungsleistung wird der EZP von der als Motor arbeitenden Pendelmaschine angetrieben.
f) Die Bremsanlage kann auch mit der Thyratron-Drehzahlregelanlage [5]) (Elektronensteuerung) ausgerüstet werden. Hiermit ist ein automatischer Drehzahlausgleich vorhanden, d. h. auch bei Leistungsänderungen (Gaswechselvorgang) ist eine garantierte Drehzahlkonstanz gewährleistet.

Durch die Regelanlage ist unter anderem ein einstellbarer Überdrehzahlschutz für den gesamten Drehzahlbereich der Pendelmaschine vorhanden.

Die Drehzahl-Regelanlage besteht aus dem Steuerschrank und dem Steuergerät, das in dem Bedienpult untergebracht ist. Die Pendelmaschine ist in offener Bauart mit freien Wellenenden ausgeführt. Anker und Gehäuse (Stator) sind in Wälzlagern gelagert. An einem der Lagerböcke der Ankerwelle ist ein Getriebe angeflanscht zur Aufnahme des Tachodynamos für die Fernanzeige der Drehzahl. Die Maschine ruht auf einem geschweißten Unterbau, dessen Abmessungen so gewählt sind, daß ihre Achshöhe und der Mittenabstand der Fundamentschrauben mit den Maßen des EZP übereinstimmen. Ein im Unterbau untergebrachtes Kühlergebläse dient zur Fremdbelüftung der Pendelmaschine. Die seitlich angeschraubten Konsole tragen die Drehmomenten-Meßwaage [6]) (Bild 8), die mit einem großen, drehbaren Skalengehäuse mit ablesbarem Ziffernblatt ausgerüstet ist; ebenfalls ist im Skalengehäuse ein Doppelpotentiometer, das mit der Zeigerachse gekuppelt ist, untergebracht. Dieses dient in Verbindung mit dem Tachodynamo zur Fernübertragung der Leistungsanzeige in PS und des Drehmomentes in kg auf ein gemeinsames Instrument im Bedienpult. Durch Vorhandensein eines Kippschalters kann die Anzeige wahlweise in PS oder kg erfolgen. Zusammen mit einer im Innern der Waage eingebauten Übersetzung beträgt die Länge des wirksamen Hebelarmes 716,2 mm, so daß sich die Bremsleistung N in einfachster Weise als Produkt aus dem angezeigten Gewicht P und dem tausendsten Teil der Drehzahl n berechnen läßt.

$$N = \frac{P \cdot n}{1000}$$

Eine Feststellvorrichtung am Unterbau der Pendelmaschine gestattet, den sonst für die Übertragung des Drehmomentes erforderlichen Pendelausschlag im Bedarfsfalle festzulegen.

[1]) VEB Elbtalwerk, Heidenau (Sa.).
[2]) VEB Galvanotechnik, Leipzig.
[3]) VEB Elektro-Apparatewerk „J. W. Stalin", Berlin-Treptow.

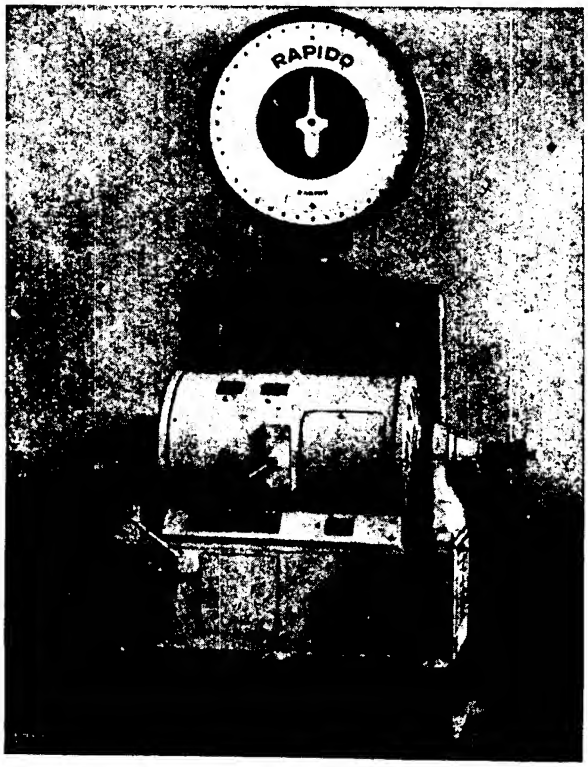


Bild 8. Pendelbremse mit Drehmomentenwaage

[4]) VEB Gelenkwellenwerk Stadtilm/Thür.
[5]) VEB Funkwerk, Leipzig.
[6]) VEB Spezial-Waagen-Fabrik Rapido, Dresden-Radebeul.

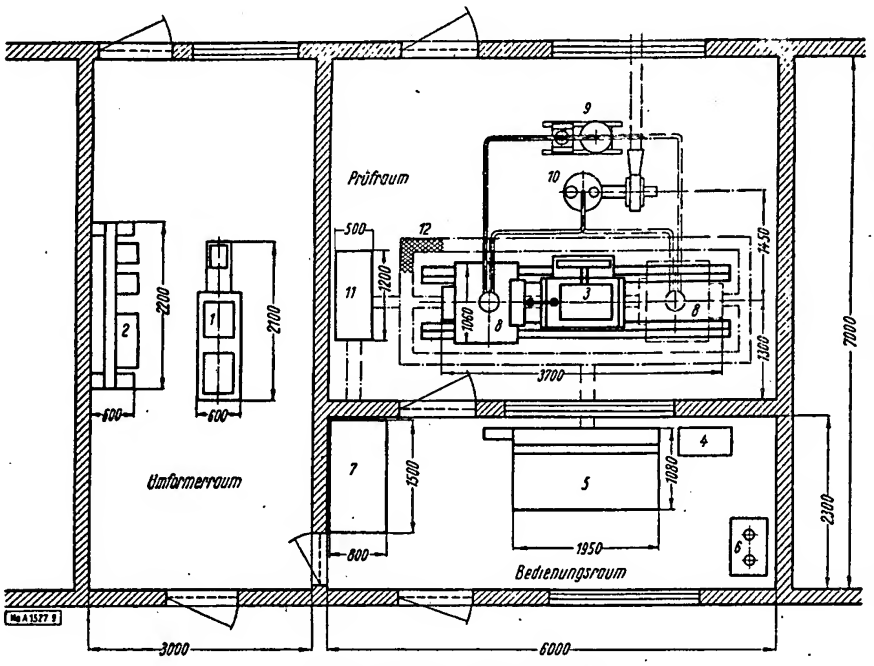


Bild 9. Grundriß der Prüfstandsanlage

die Zählwerke automatisch ab, so daß man die Werte ablesen kann.

Im Bedienpult befindet sich das Betätigungs- und Regelgerät für die Thyratron-Regelanlage.

Kraftstoffversorgung mit Meßeinrichtung

Die Kraftstoffmeßanlage ist ein 2-Tanksystem. Sie dient zur allgemeinen Brennstoffversorgung des Prüflings und zur Ermittlung des spezifischen Verbrauches. Der Kraftstoff fließt von einem der Vorratsbehälter über die Meßwaage [6]), die lichtschrankengesteuert ist, durch Magnetventile, Förderpumpe und Filter zum Motor. Eine jeweils zu messende Brennstoffmenge ist an der Waage einstellbar (Meßbereich 0 bis 200 g). Die Lichtschrankensteuerung (Fotozelle) löst durch Fernübertragung die Stichzählwerke aus, die im Bedienpult eingebaut sind.

III. Aufstellung der Prüfstandsanlage

In Bild 9 ist eine Einzylinderprüfstandsanlage im Grundriß aufgezeichnet. Sämtliche Einrichtungen und Meßgeräte sind so angeordnet, daß sie für die Versuche bequem zu bedienen bzw. zu beobachten sind. Je nach den Raumverhältnissen kann die Anlage auch umgestellt werden bzw. je nach den geplanten Versuchen erweitert werden.

IV. Bedienungs-, Meß- und Überwachungseinrichtungen

Meß- und Steuerpult (Bedienpult)

Das Bedienpult ist als Zentrale für alle mit dem Gesamtprüfstand in Betracht kommenden Vorgängen zu betrachten. Es enthält alle für die Inbetriebnahme und Überwachung der Prüfstandsanlage einschließlich Prüfling, notwendigen Schalter, Armaturen, Bedienhebel und Überwachungsinstrumente. Die wichtigsten Schaltvorgänge werden durch Kontrollampen angezeigt. Im Bedienpult sind vielfach Meßstellenumschalter eingebaut für Thermoelemente und Widerstandsgeber, die es ermöglichen, Lager-, Kolben-, Ventil- und sonstige Temperaturen wahlweise am Instrument abzulesen. Außerdem ist ein Stichzähler eingebaut, der bei Handbetrieb Zeit, Drehzahl und Luftmenge angibt. Bei Automatikbetrieb arbeiten die Zählwerke so, daß ihre Angaben auf eine bestimmte vorgegebene Kraftstoffmenge bezogen werden können. Nach Verbrauch dieser Kraftstoffmenge schalten

Kühl- und Schmierstoffversorgungs-Kühlanlage

Diese übernimmt jeweils für Kurz- und Dauerbetrieb die notwendige Kühl- und Schmiermittelversorgung des Prüflings. Beide Funktionen sind in einem fahrbaren Gestell untergebracht und bilden jeweils für sich einen über den Prüfling geschlossenen Kreislauf.

Von dem für Schmier- und Kühlmittel eingebauten elektrisch beheizbaren Vorratsbehältern, über einstellbare Kontaktthermometer ein- und ausschaltbar, gelangt das jeweilige Mittel über Umwälz- bzw. Förderpumpen zum Prüfling, von hier zur Versorgungsanlage zurück, wo jeweils für Schmier- und Kühlmittel getrennt zwei Kühler eingebaut sind, wieder in den Vorratsbehälter. Die Kühlerpaare sind umschaltbar, d.h. Kühlerumgehung bzw. mit einem oder mit zwei Kühlern. Sämtliche Vor- und Rücklaufleitungen sowie die Frischwasserversorgung liegen zentral auf einer Seite des Gestells.

Die Temperaturen der Kühlmedien (Öl — Wasser — Glykol) werden im allgemeinen durch Zusatz von Frischwasser über die Kühler von der Hand geregelt. Der Einbau eines selbsttätig arbeitenden Gerätes zur Regelung der Temperatur ist möglich.

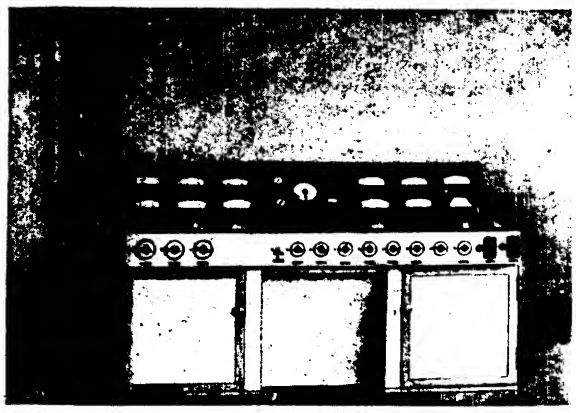


Bild 10. Bedienpult mit Druckmeßtafel

Bild 11. Kraftstoff-Meßanlage

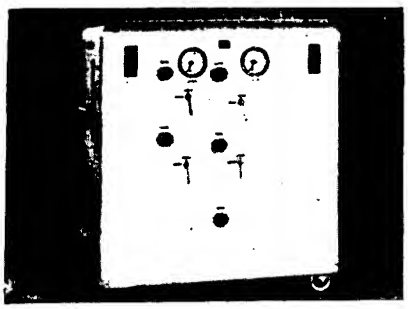


Bild 12. Kühl- und Schmierstoffversorgungsanlage

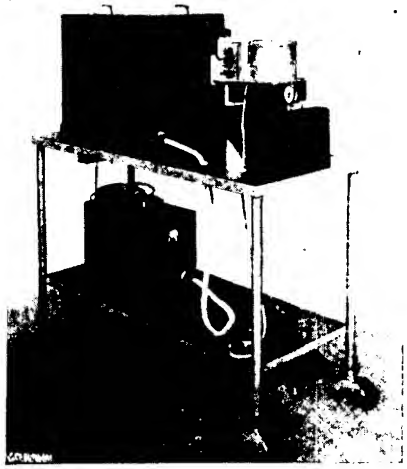


Bild 13. 4-Strahl-Oszillographierungsanlage

Luftverbrauchsmeßanlage für Verbrennungsluft

Die Luftverbrauchsmeßanlage für Verbrennungsluft besteht aus einem Drehkolbengasmesser [7]) in Verbindung mit einem Ausgleichsbehälter gemeinsam auf einem Rahmen montiert und durch eine Rohrleitung verbunden. Der Ausgleichsbehälter hat die Aufgabe, die vom Prüfling angeregte pulsierende Strömung der Luft in der Ansaugleitung zu beruhigen, so daß sich keine Stöße auf den Drehkolbengasmesser auswirken können. Außer dem am Drehkolbengasmesser angebrachten Zählwerk für direkte Ablesung ist zusätzlich ein Tachodynamo für Fernübertragung zum Stichzähler im Bedienpult vorhanden.

Abgas-Absaugeanlage

Die Anlage hat die Aufgabe, den Prüfraum von gesundheitsschädlichen Abgasen frei zu halten. Sie besteht aus einem wassergekühlten Auspufftopf mit Explosions-Schutzventil und dem Absaugegebläse. Vom Absaugegebläse werden

Oszillographierungsanlage (Vierstrahl)

Der Kathodenstrahloszillograph [8]) ist ein Gerät zur Aufzeichnung schnell veränderlicher Vorgänge und arbeitet trägheitslos.

Der Oszillograph ist mit einer Registriereinrichtung ausgerüstet. Eine mit Film- bzw. Oszillographen-Registrierpapier bespannte Trommel, die vor den beiden übereinanderliegenden Kathodenstrahlröhren im lichtabgedichtetem Gehäuse (elektr. angetrieben) läuft, ermöglicht durch entsprechender Aufnahmeoptik-Verschluß und Strahlablenkung bis zu vier Aufzeichnungen verschiedener Vorgänge am jeweiligen Versuchsobjekt gleichzeitig.

Auf Grund verschiedener Geber wie Zündzeitpunkt-, Zündverzug, Verbrennungsdruck- und -temperatur, Klopfbeginn, Klopffrequenz können Vorgänge registriert zur Auswertung festgehalten werden. Für die Zeitmarkierung ist eine Zeitmarke von 1000 Hz im Oszillographen eingebaut.

Schlußbetrachtung

Trotz der weitgehenden Beschreibung der gesamten Prüfstandsanlage wird es dem Konstrukteur-, Forschungs- und Versuchsingenieur nicht entgangen sein, daß verschiedene Prüfstandseinrichtungen — besonders die Meß- und Regeleinrichtungen nur im allgemeinen erwähnt wurden und einer individuellen Behandlung bedürfen.

Sämtliche im Aufsatz, nicht mit einer Fußnote versehenen, angeführten Aggregate und Geräte sind eine Eigenentwicklung und werden im WTB hergestellt. MaA 1527.

[7]) VEB Gaselan, Berlin.

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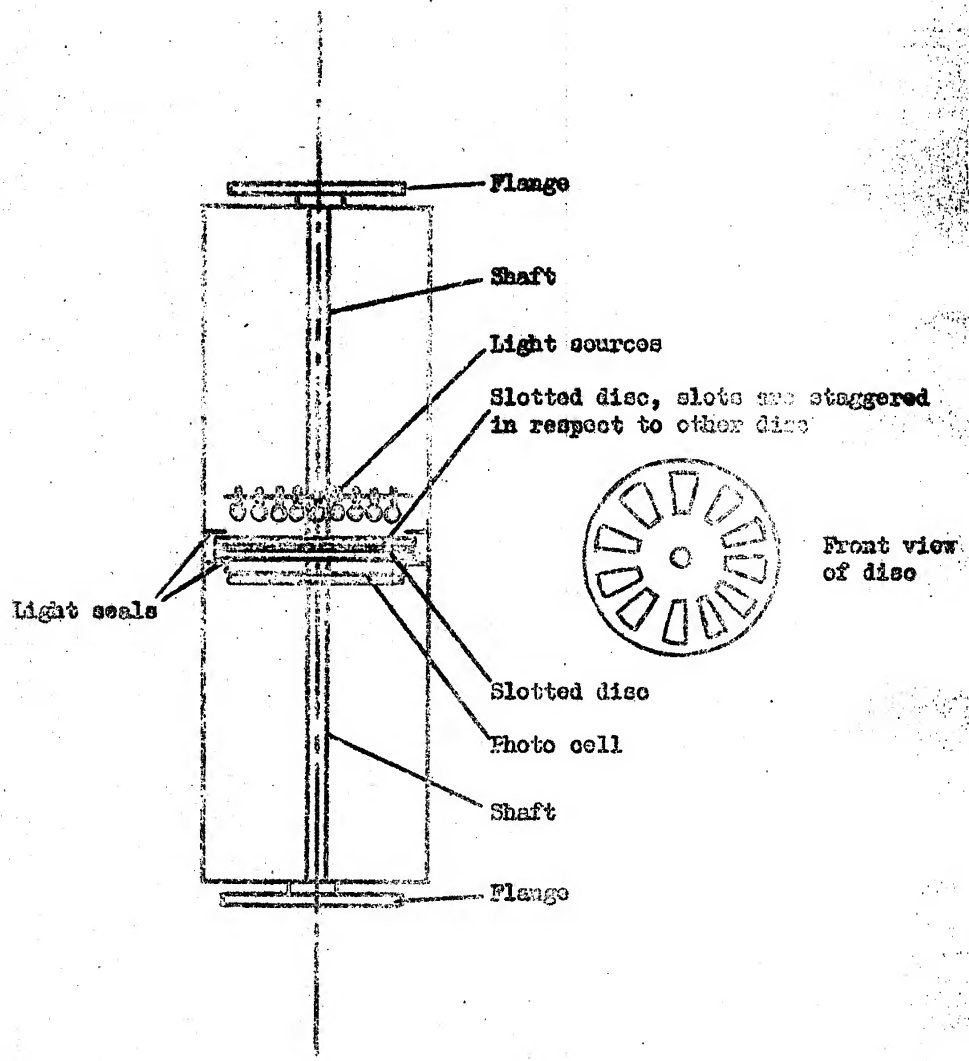
Subject: Some Projects of VEB WTB IV

PHOTO-ELECTRIC TORQUE METER



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Appendix "I"

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Subject: Some Projects of VEB WTB IV

INDUCTANCE TORQUE METER, TYPE I + II

Fig. 1

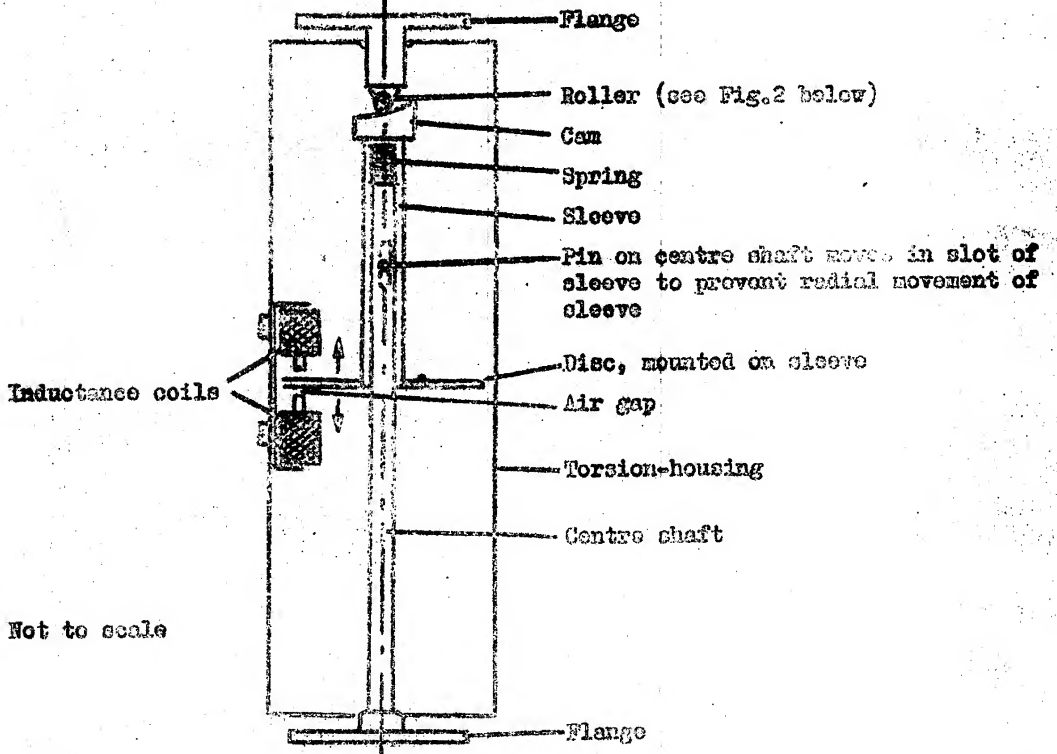

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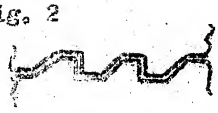
Fig. 2



Saw-tooth like roller and cam arrangement, used on type II equipment

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Appendix "F"

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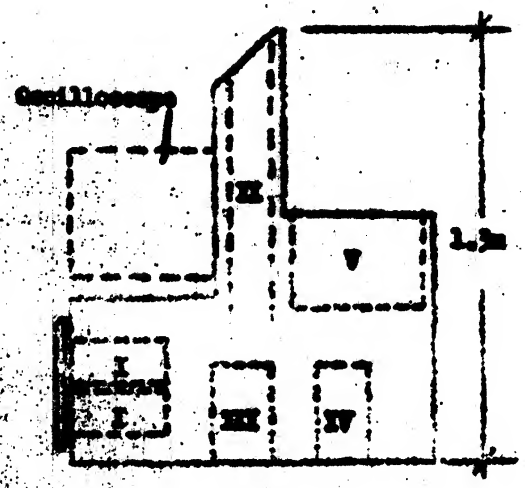
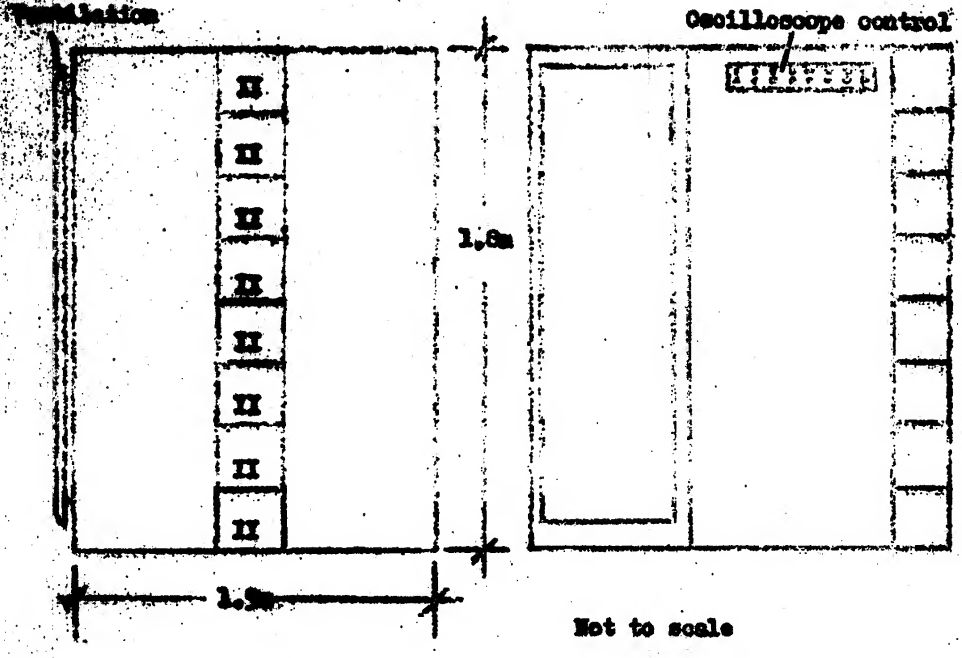
Subject: Some Projects of [redacted]

D.C. AMPLIFIERS FOR USE WITH
8-RAY OSCILLOSCOPE





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Appendix "G"

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Subject: Some Projects of VEB WEB IV

Fig. 1 PHOTO-ELECTRIC TRANSMITTER FOR AUTOMATIC RPM METER

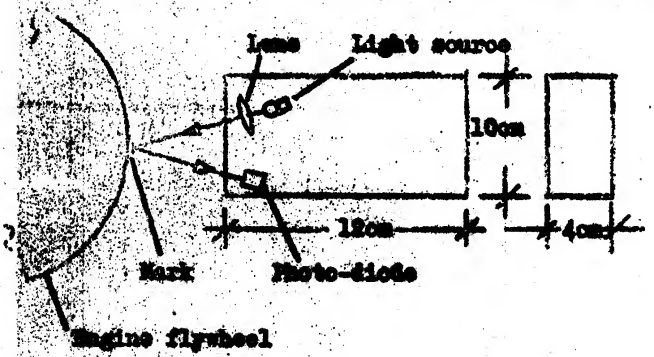
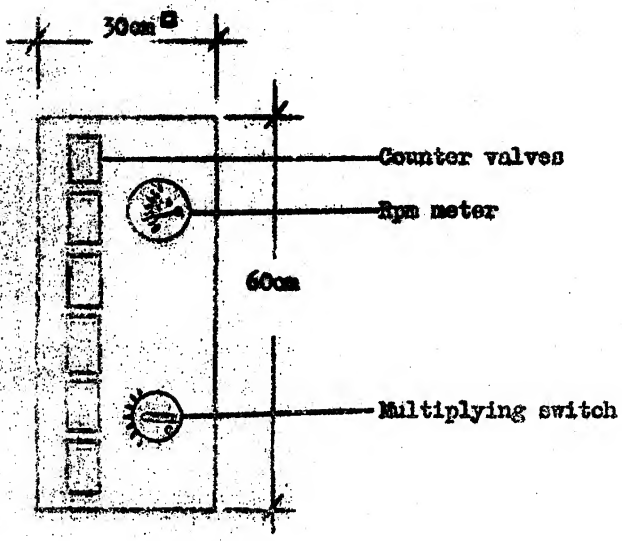


Fig. 2 AUTOMATIC RPM METER
Top view



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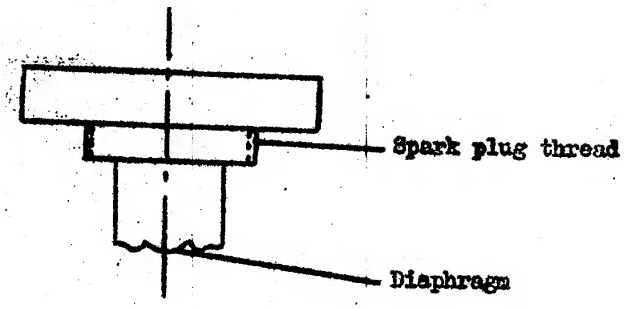
Appendix "H"

Subject: Some Projects of VEB WBB IV

RESISTANCE PRESSURE TRANSMITTER



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Appendix "I"

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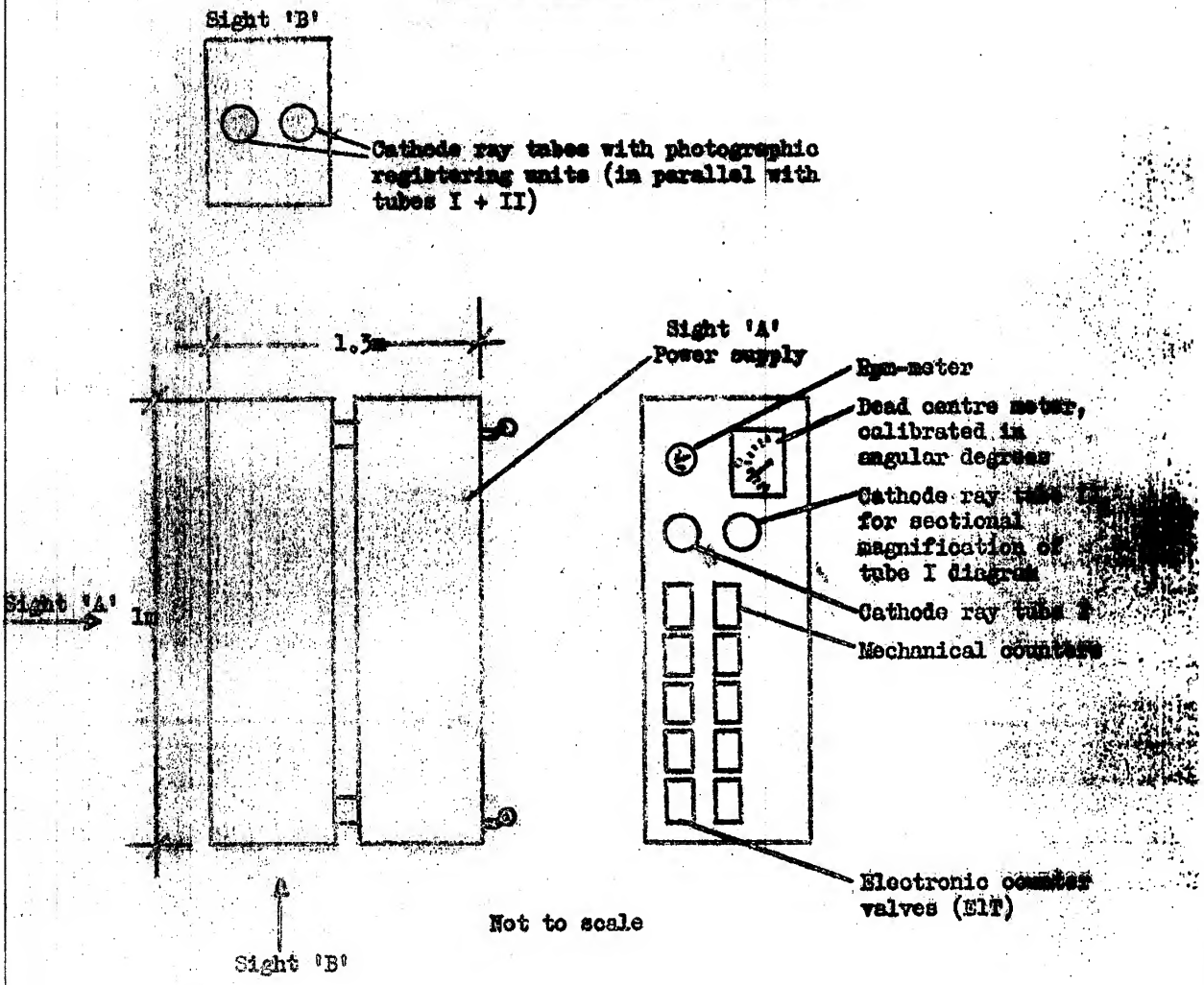
Subject: Some Projects of VEB WBB IV

COTANE NUMBER MEASURING EQUIPMENT



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Appendix "J,"

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Subject: Some Projects of VEB WTB IV

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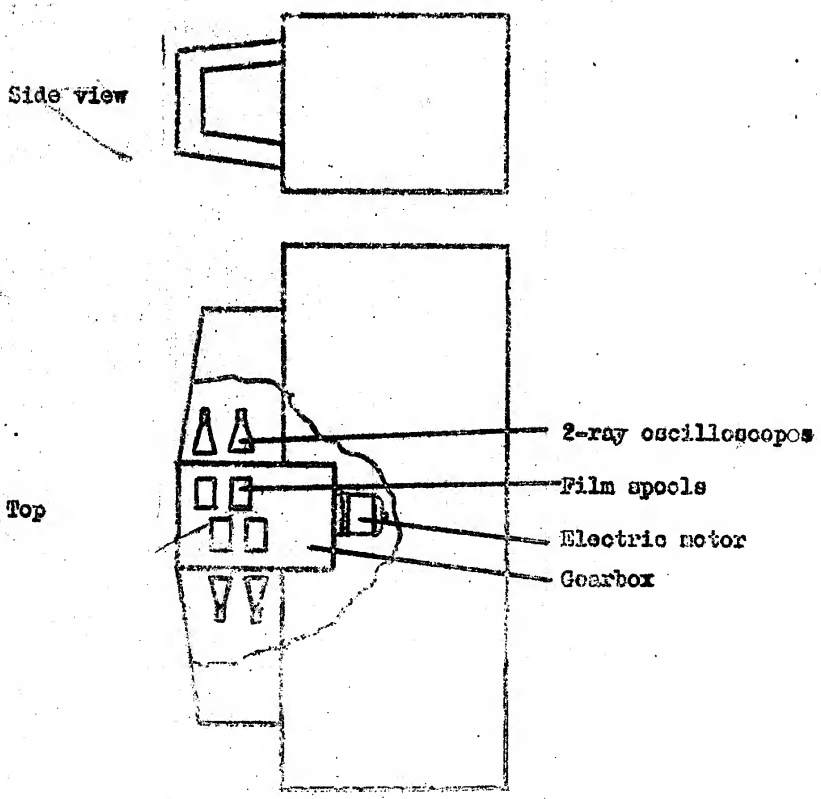
8-RAY OSCILLOGRAPH



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Appendix "J_2"

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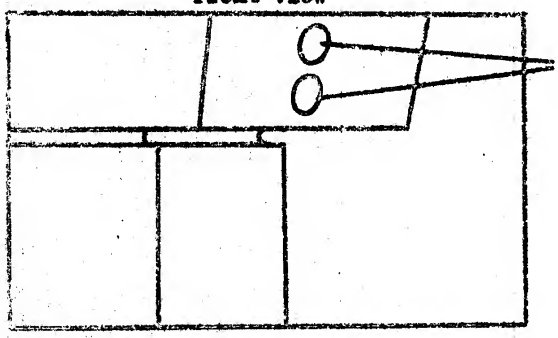
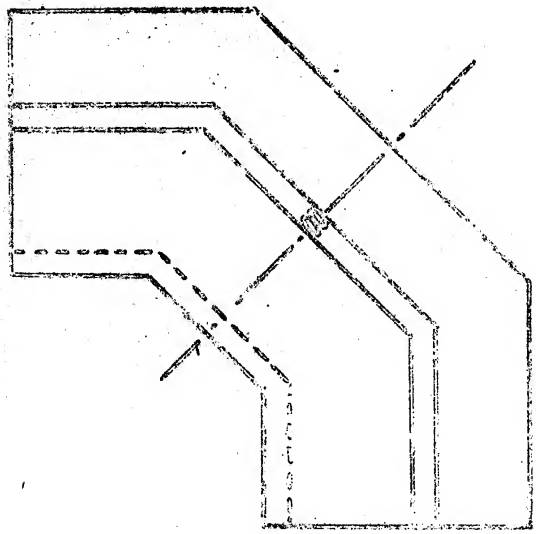
Subject: Some Projects of VEB WTB IV

CONTROL DESK FOR S-RAY OSCILLOGRAPH

Front view



Top view



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Appendix "J$_5$"

Subject: Some Projects of VEB WBB IV

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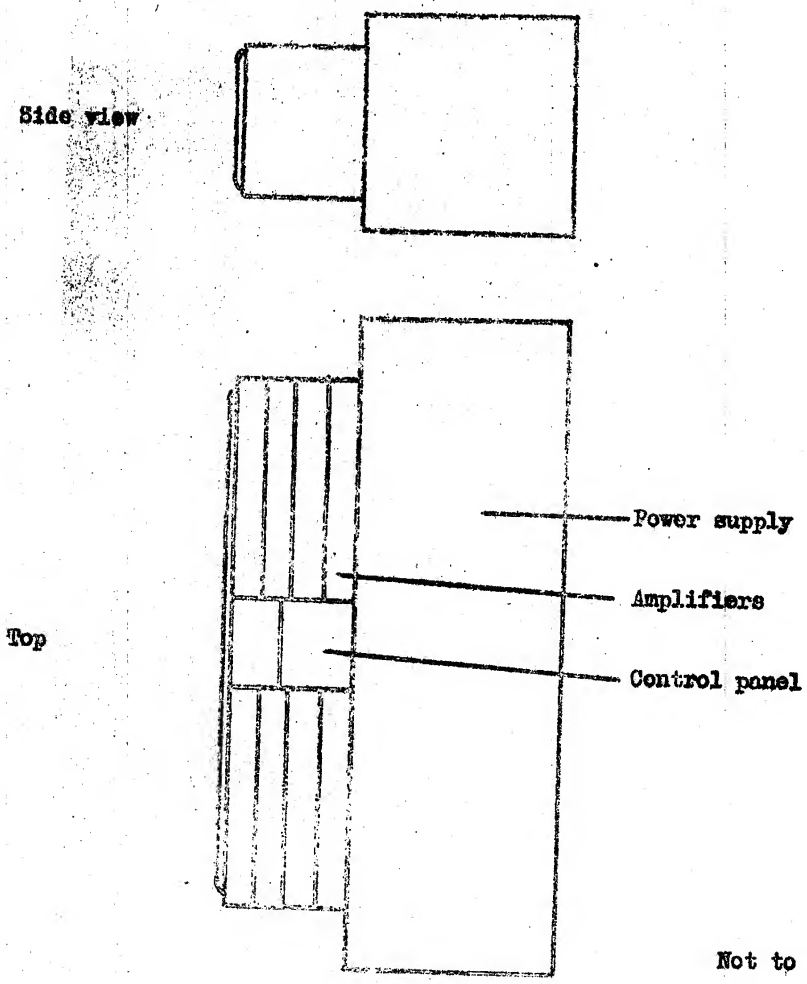
AMPLIFIER AND POWER SUPPLY UNIT FOR X-RAY OSCILLOGRAPH



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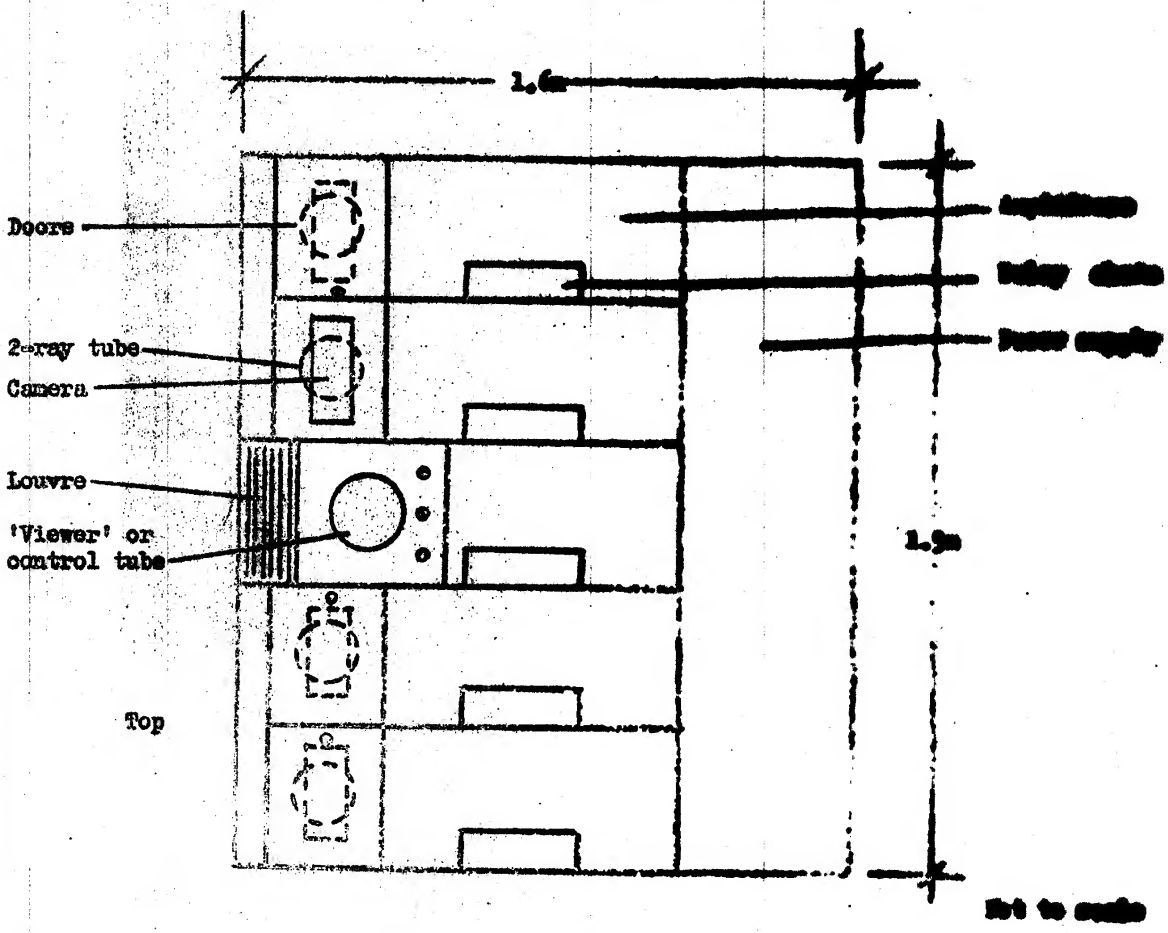
HIGH CAPACITY [redacted]



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Appendix "L"

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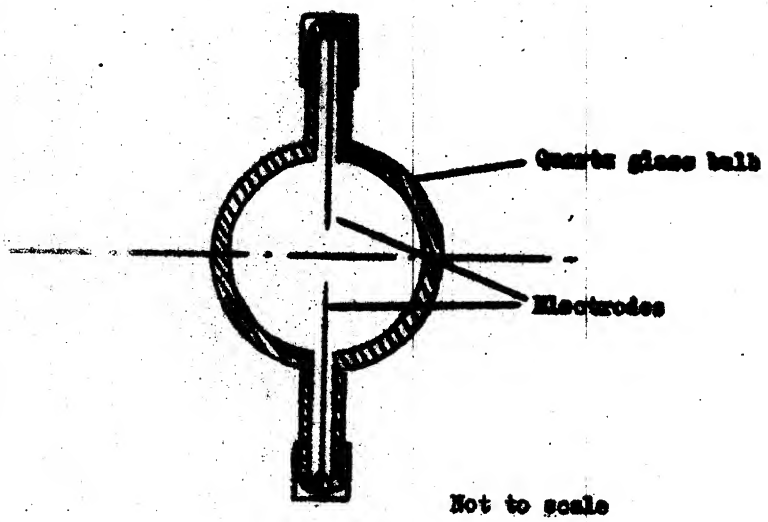
[redacted] Some Projects of [redacted] IV

XENON ARC LAMPS



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Appendix "B"
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Some Projects of VEB WTB IV

P R O B E S

Fig. 1 PROBE STRUCTURE

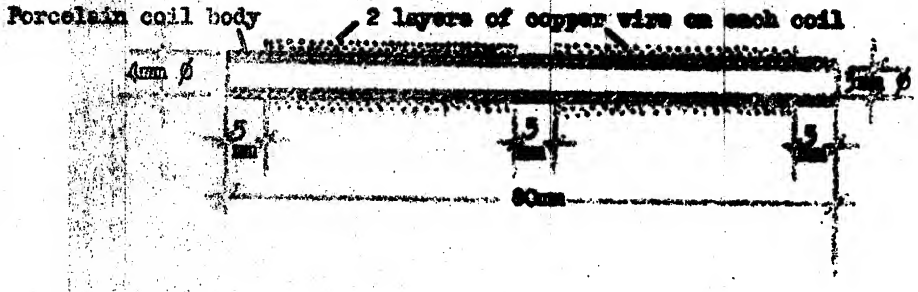
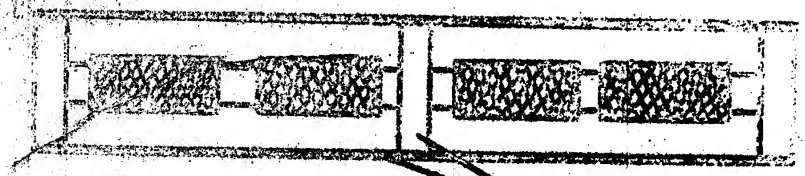


Fig. 2 MOUNTING OF PROBES, 2 IN A ROW



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Appendix "M_2"

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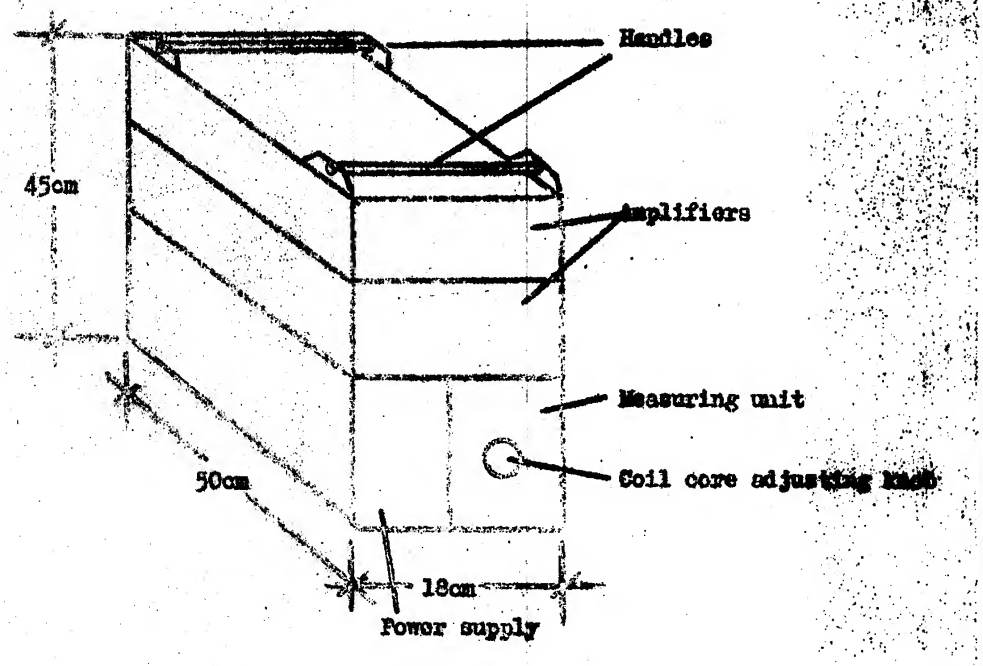
Subject: Some Projects of VEB WTB IV

P R O B E S

Equipment used with Probes



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Appendix "B"

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[redacted] Some Projects of the CIA IV

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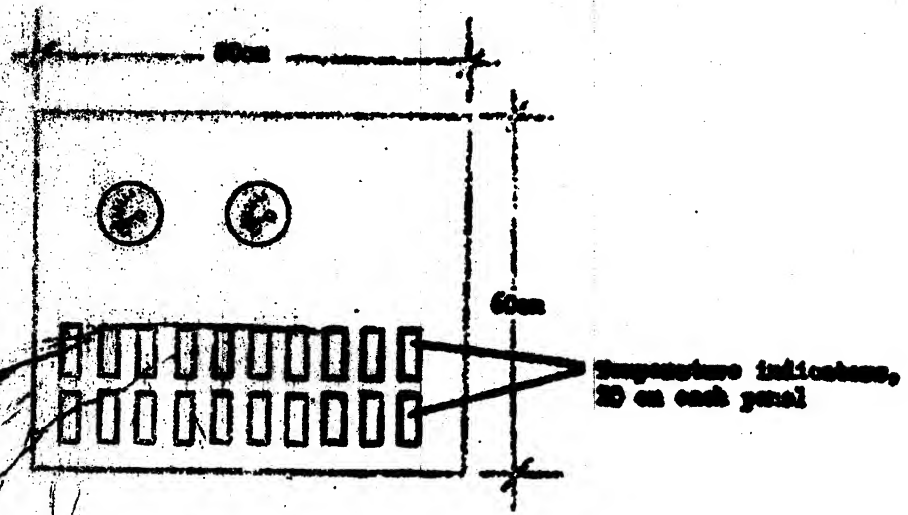
Fig. 1 [redacted]

Fig. 2 [redacted]

Top



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Appendix "C"

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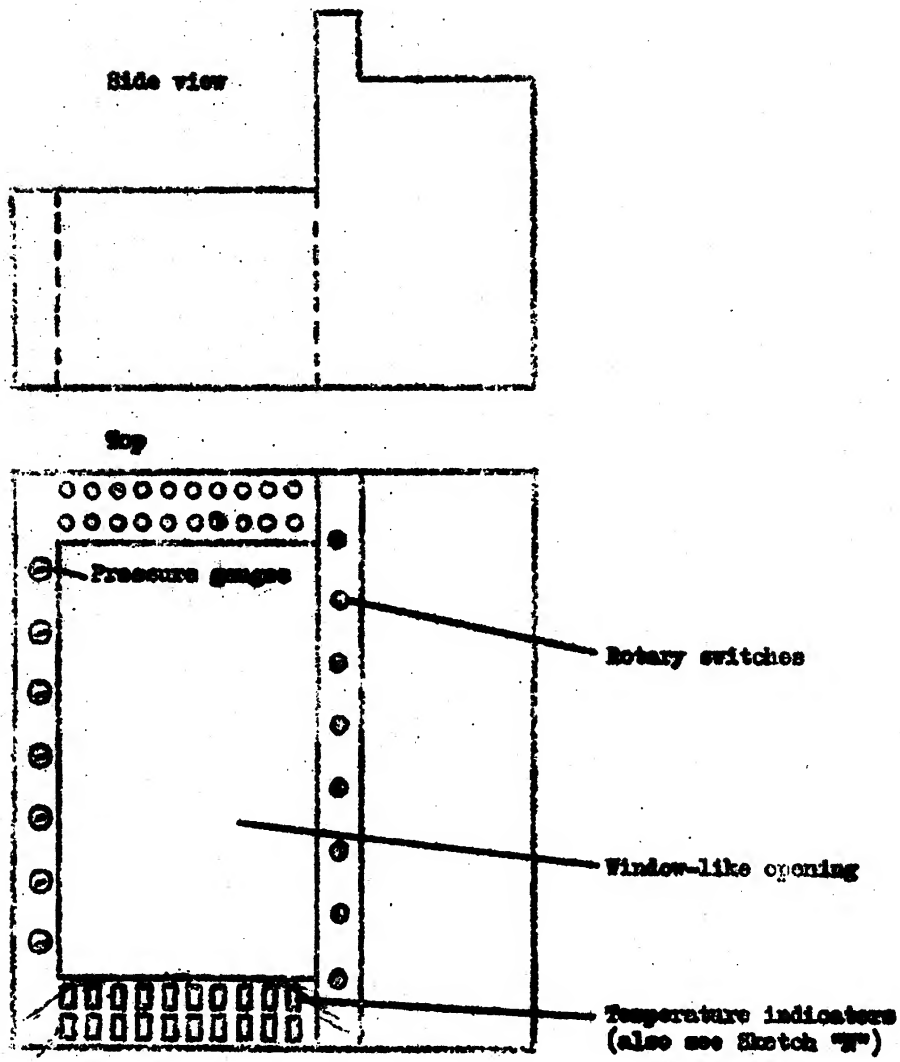
[redacted] Some Projects of VEB WTB IV

CONTROL BOARDS FOR AIRCRAFT ENGINE TEST STANDS



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Some Projects of VEB WTB IV

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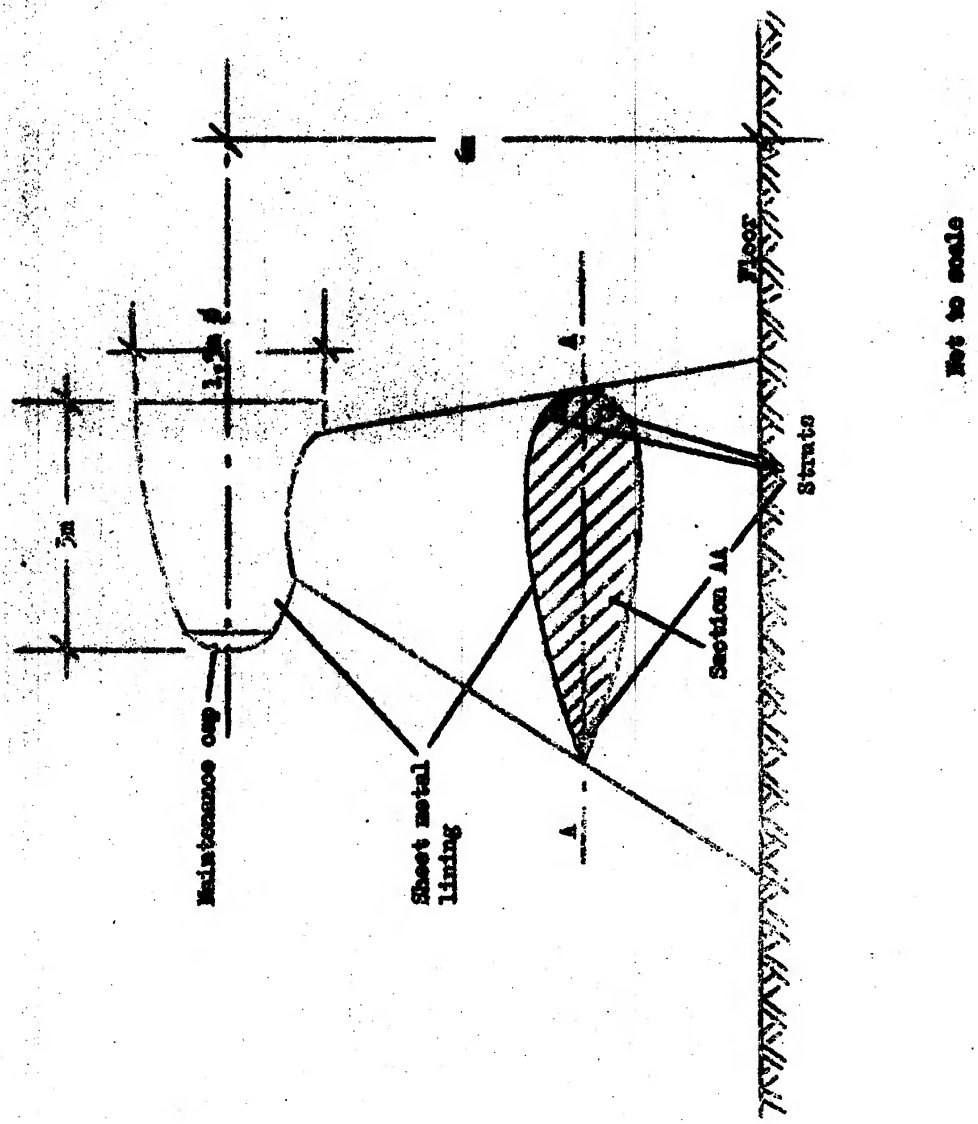

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Appendix "D$_1$"

Subject: Some Projects of VEB WTB IV

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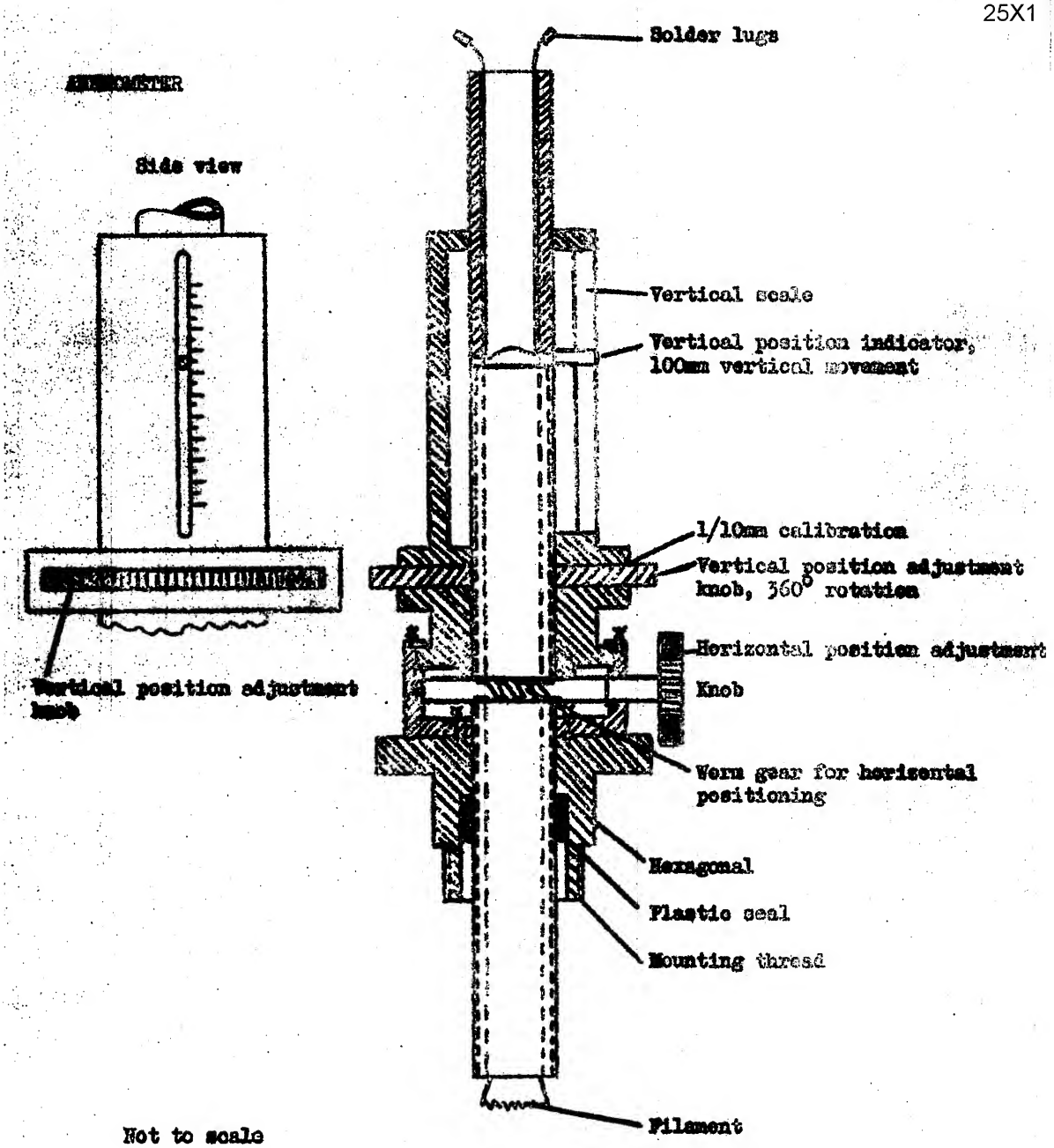

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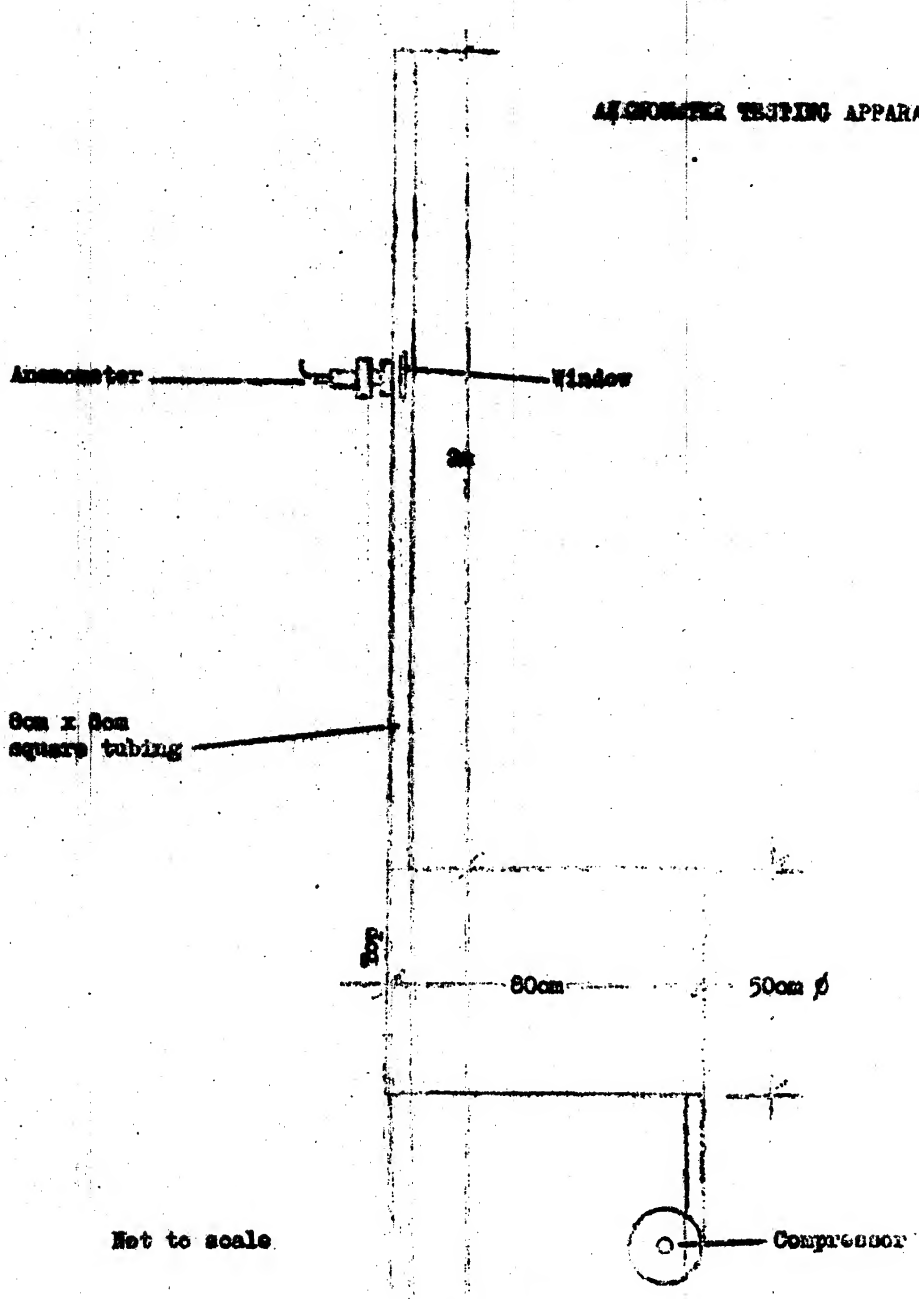
Subject: [redacted] Project [redacted] 17

ANEMOMETER TESTING APPARATUS



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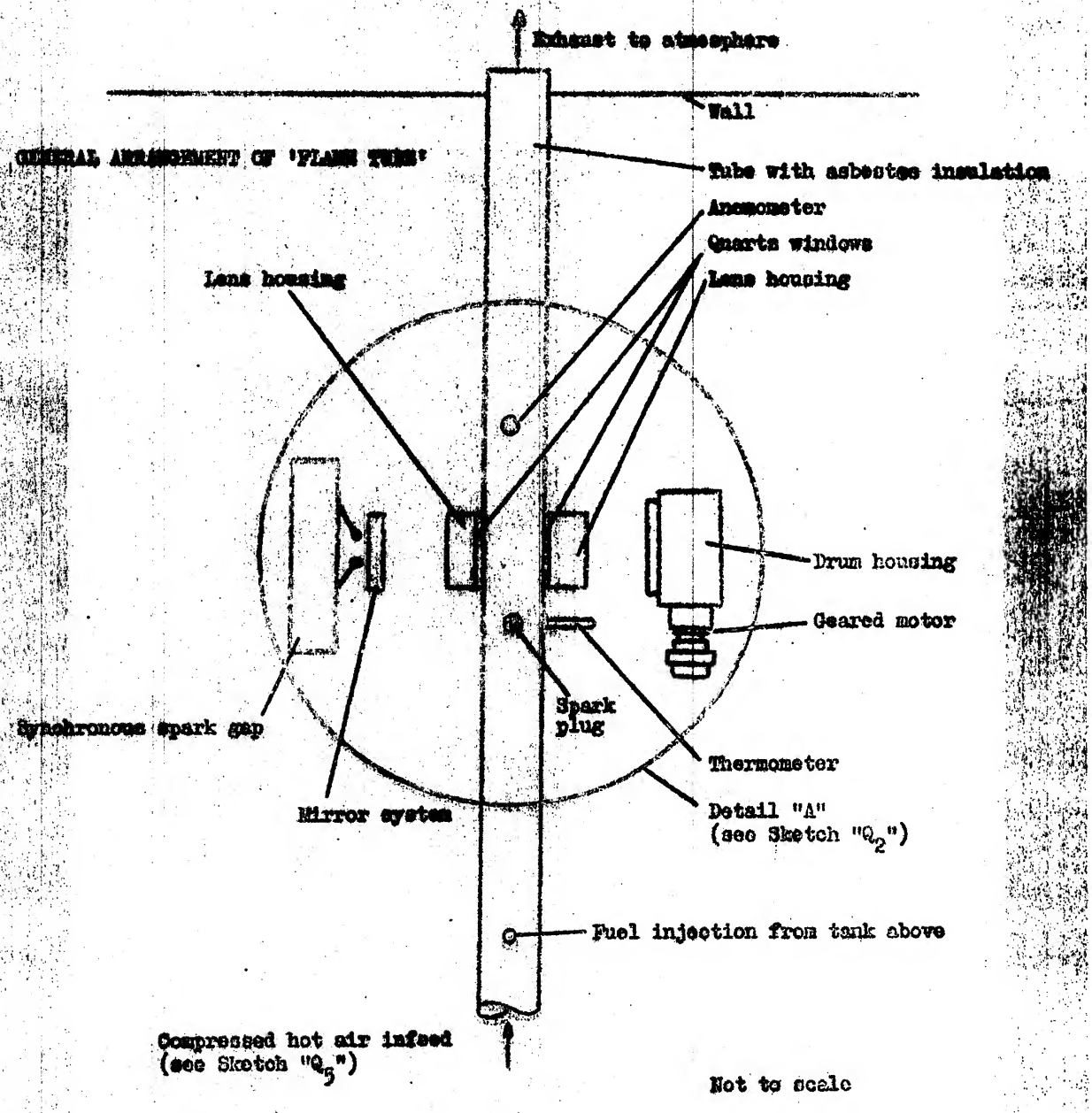
Subject: Some Projects of VEB WTB IV



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Appendix "C2"

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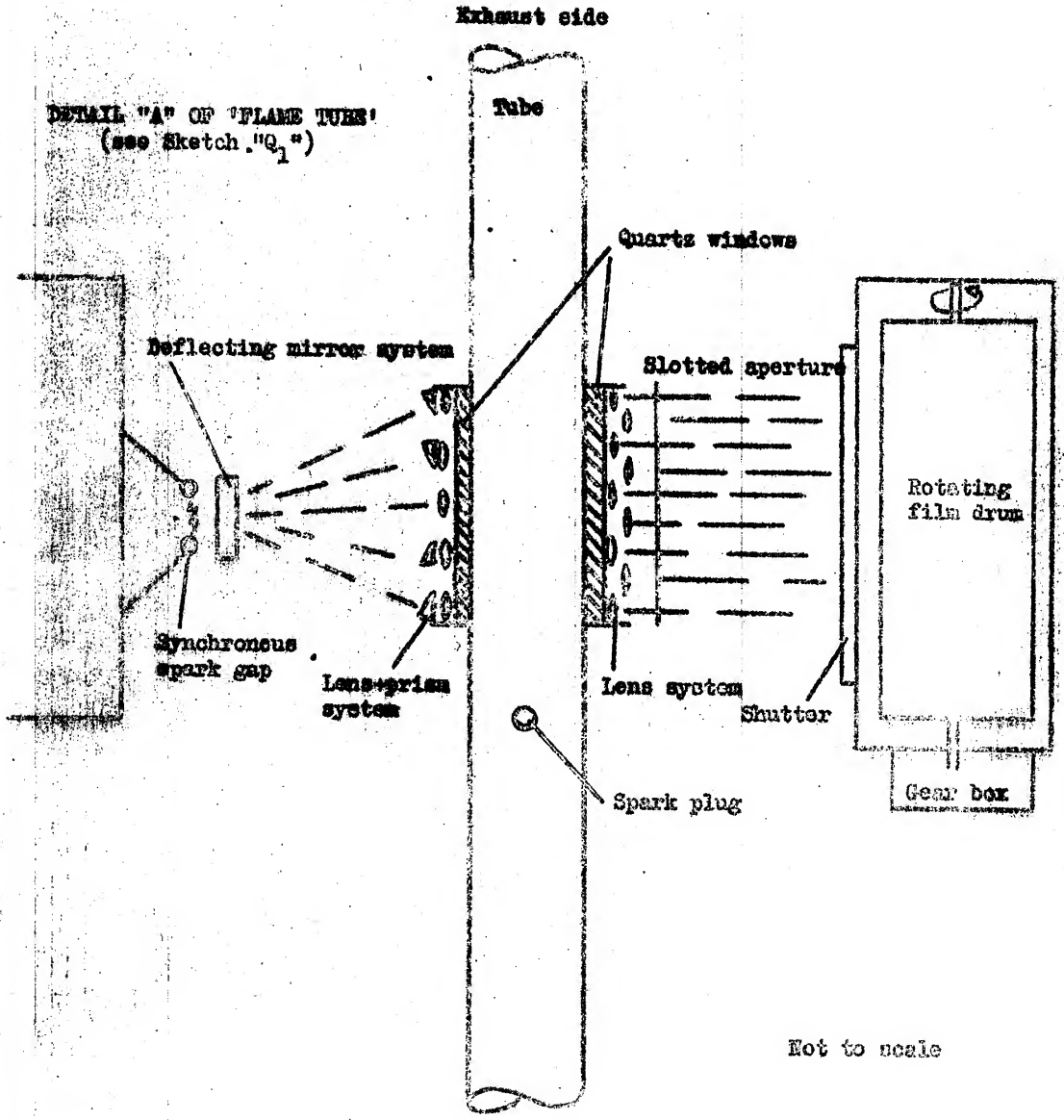
Subject: Some Projects of VEB WTB IV



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Appendix "C"

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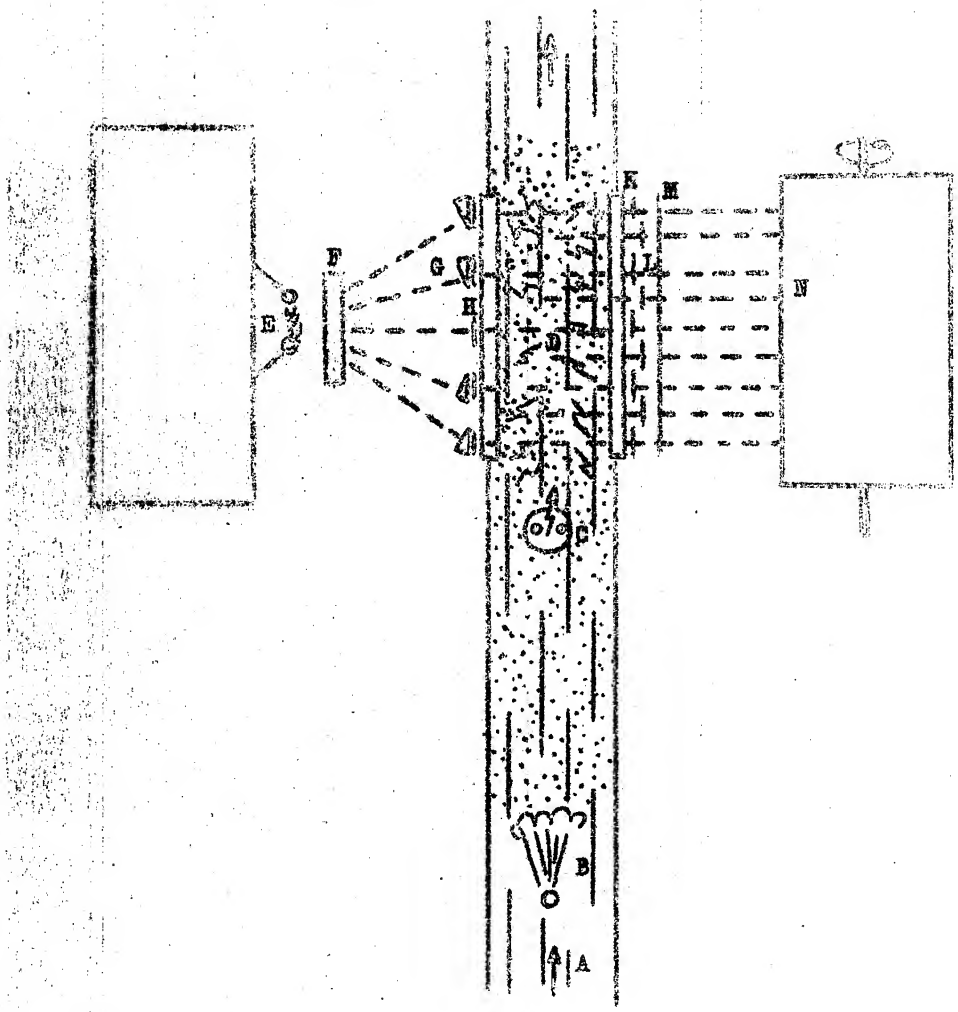
Subject: Some Projects of VEB WTB IV

OPERATION SCHEME OF 'FLAME TUBE'



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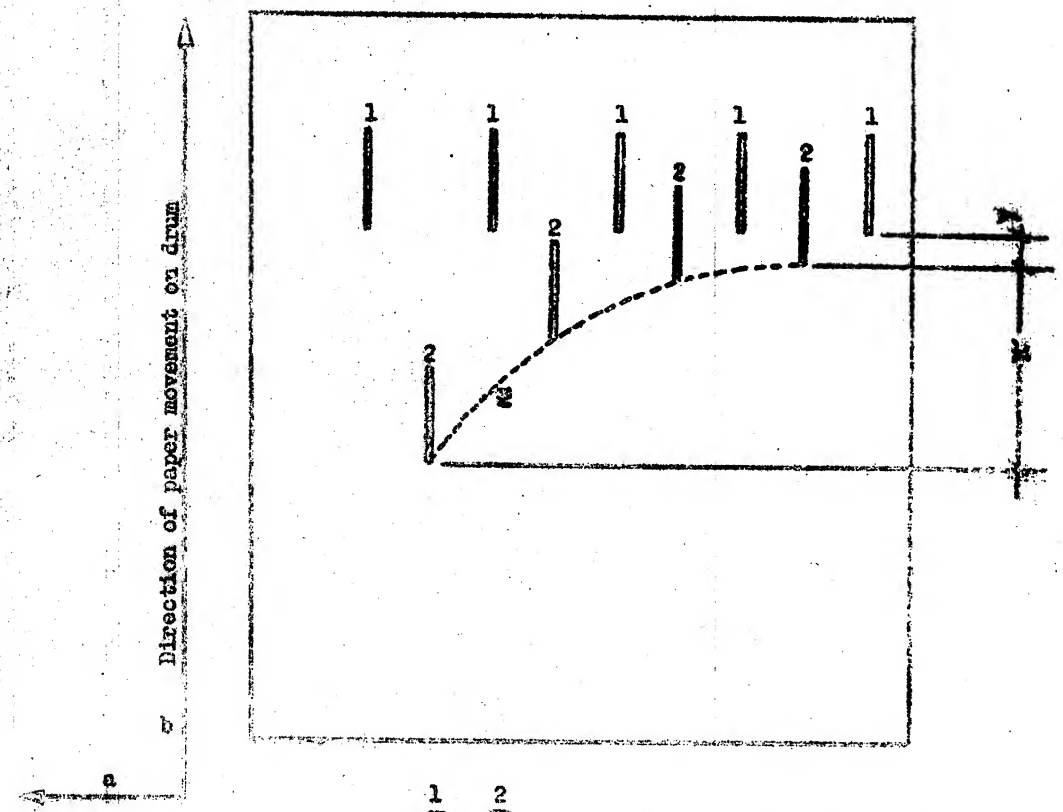
Appendix "Q4"

Subject: Some Projects of VEB WBB IV

25X1

GRAPH OF TEST CYCLE OF 'FLAME TUBE'



1 = Standard (spark gap) mark, reference heat 'colour'

2 = Fuel mark as generated by the explosion of the fuel-air mixture

Not to scale

a = Direction of fuel ignition
b = Time ordinate
x = Ignition speed
y = Ignition delay, distance of spark plug from 1st slot
z = Time curve (spherical)

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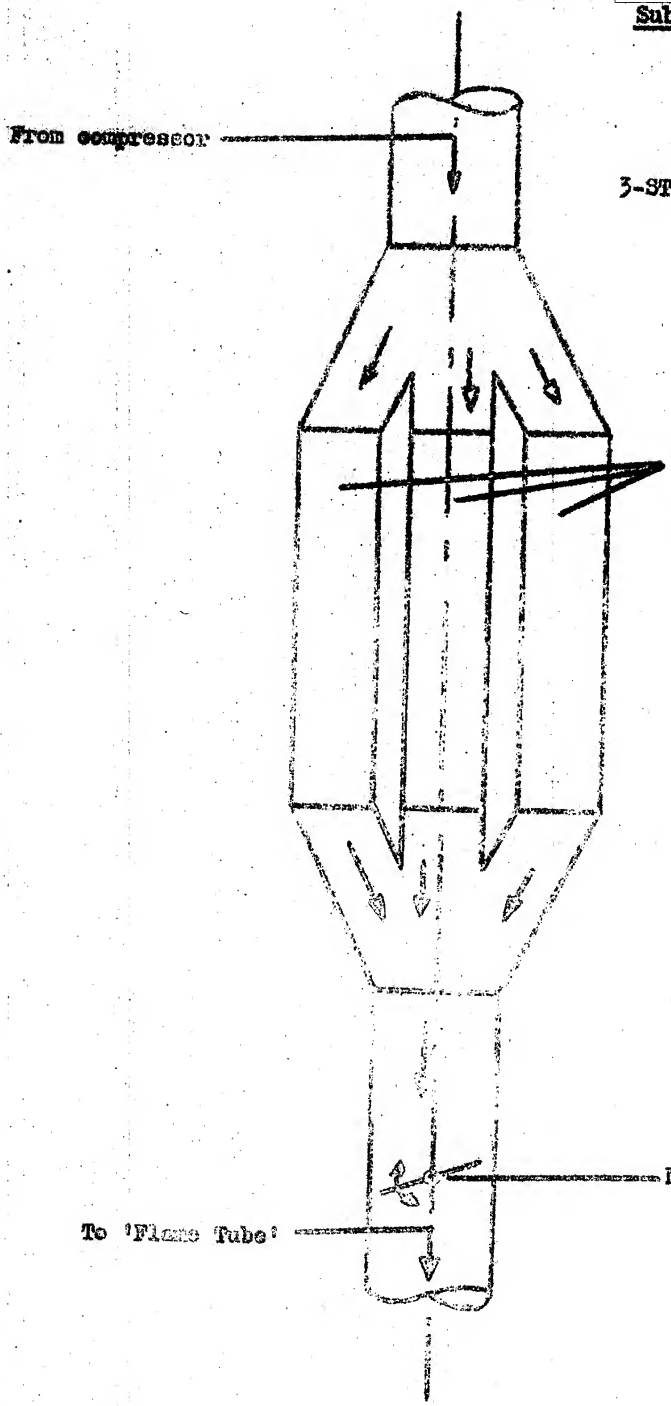
[redacted]

25X1

[redacted]

Subject: Some Projects of VEB WTB IV

25X1



3-STAGE AIR-HEATER OF 'FLAME TUBE'

Not to scale

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[redacted]

25X1

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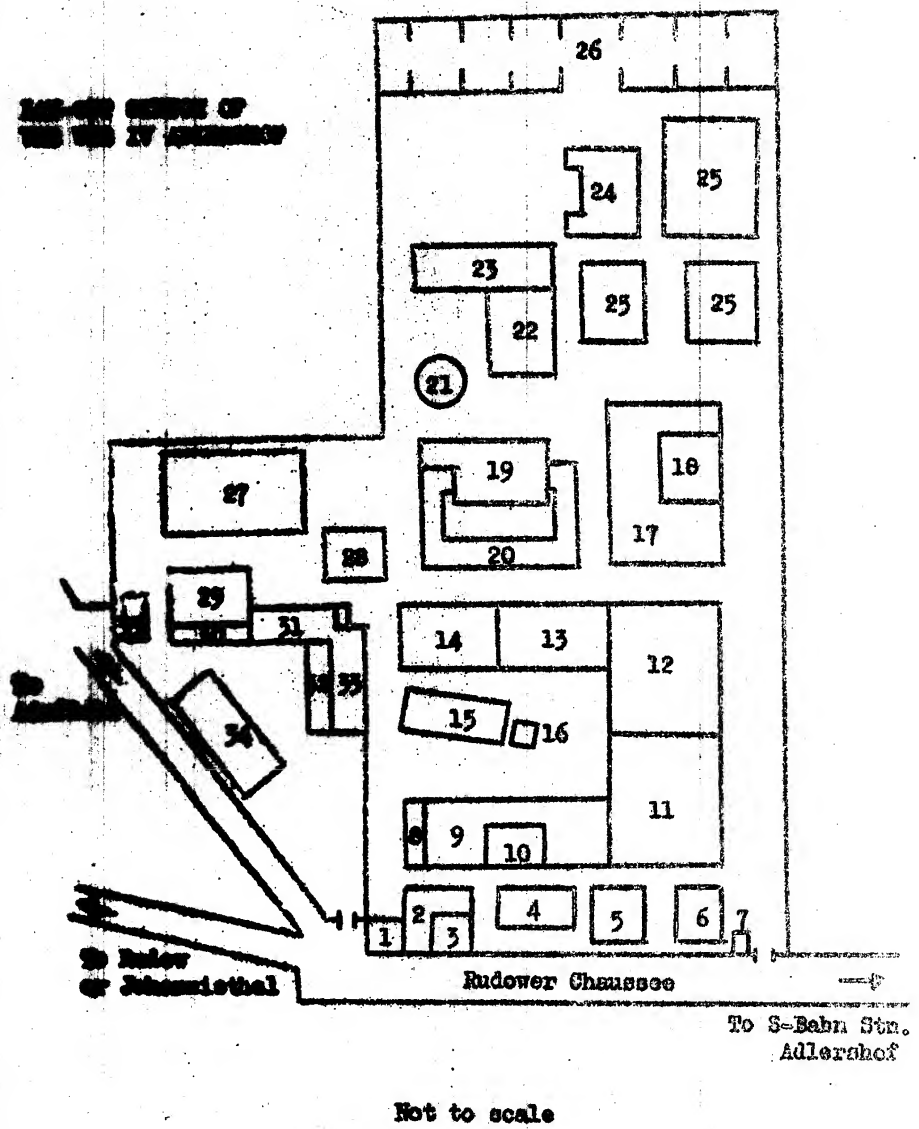
Appendix "R"

[redacted]

Subject: Some Projects of VEB WTB IV

25X1



Not to scale

25X1

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Legend to Appendix "B"

1. Entrance
2. Toilets and wash rooms
3. Carpenter's shop
4. Spray painting
5. Storage (paints, oil, raw materials)
6. "Hall No 14" test stands
7. Entrance
8. Quality control and mechanical workshop
9. Mechanical workshop and tool making
10. Materials storage
11. Mechanical workshop
12. Test stands
13. Garages
14. Mess
15. Research and design
16. Test stand
17. Electrical workshop
18. Test stands
19. Design and draughting
20. Wind tunnel
21. Spinning wind tunnel
22. Garage and storage
23. Library, maintenance mechanics
24. Test stands
25. Climate test laboratory
26. Garages (not used at present)
27. Research and test stands
28. Heating station
29. Test stands
30. Control room for 29
31. Engine test stands
32. Director's building
33. Measuring laboratory
34. Book keeper
35. P.O.L. storage

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